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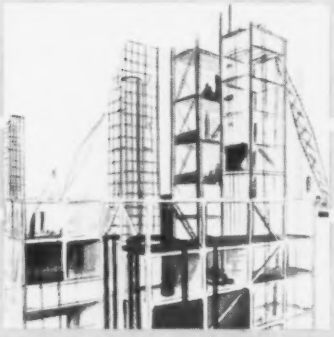

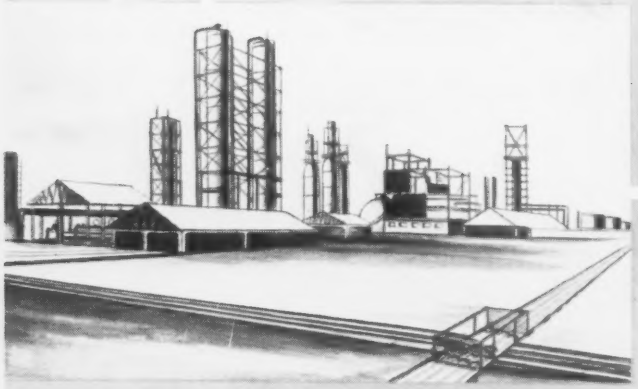

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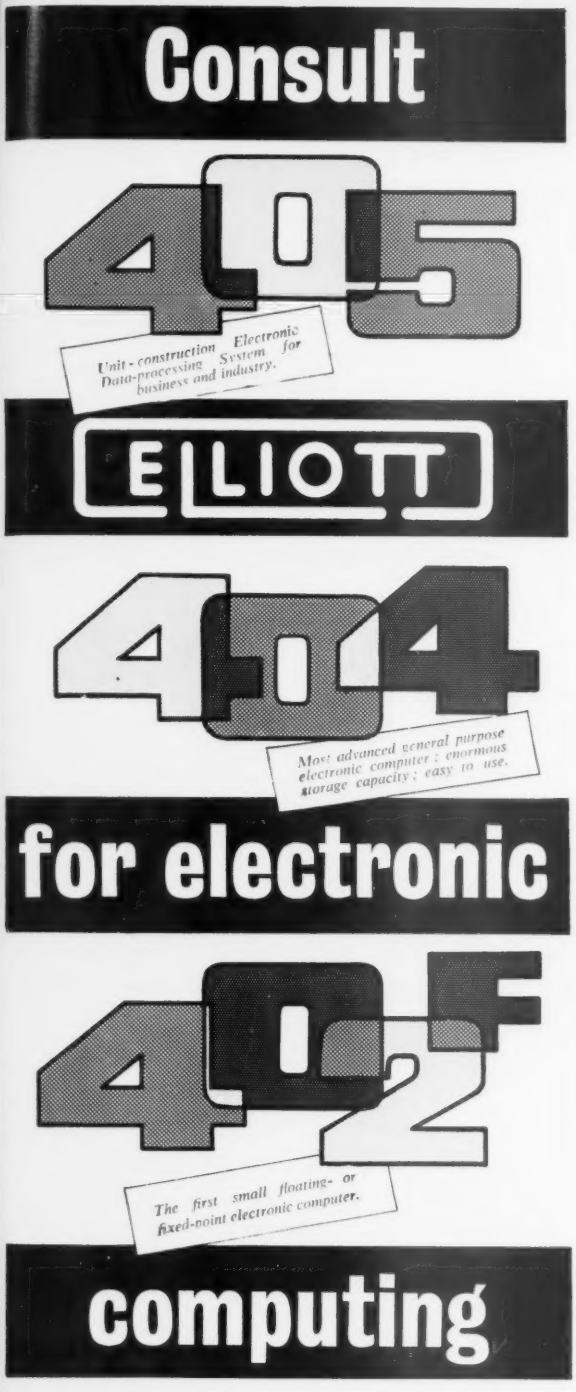

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Vol. 10, No. 116 **August 1956**

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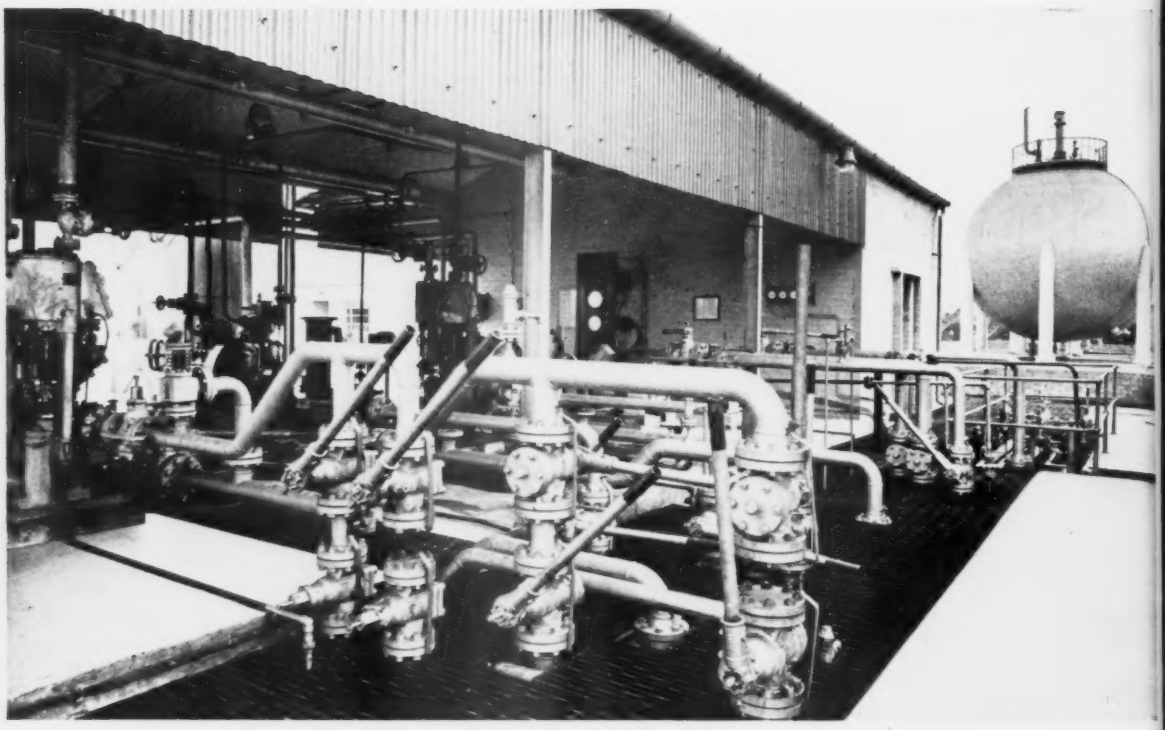

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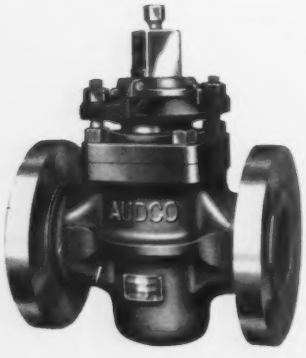

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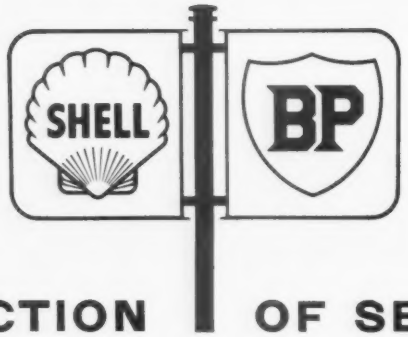

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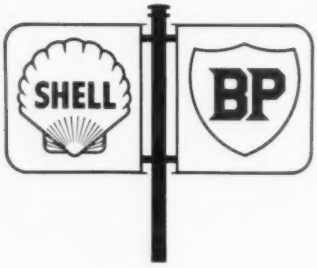

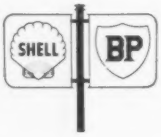

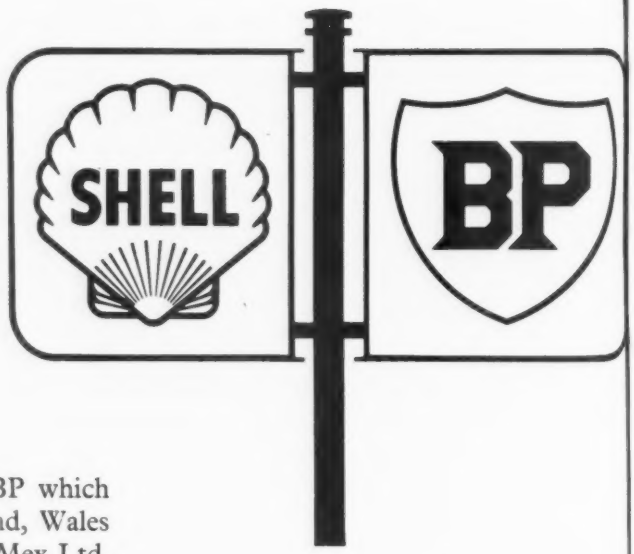

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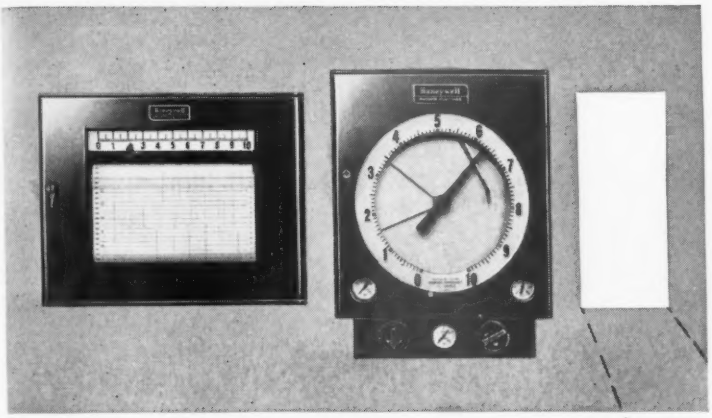

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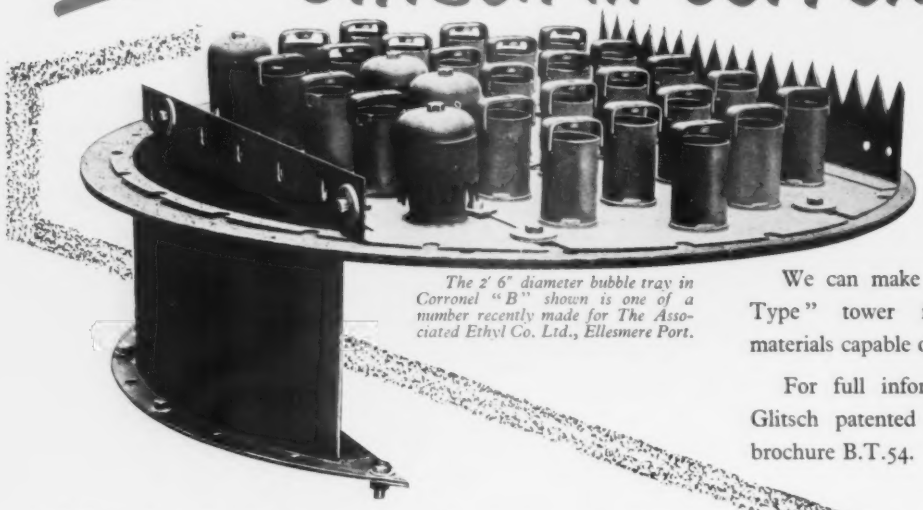

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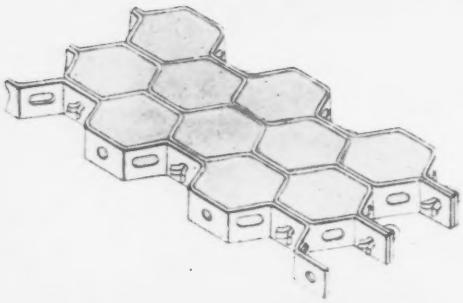

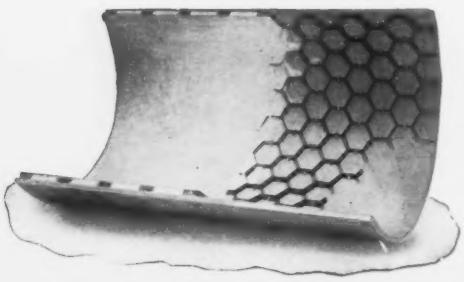

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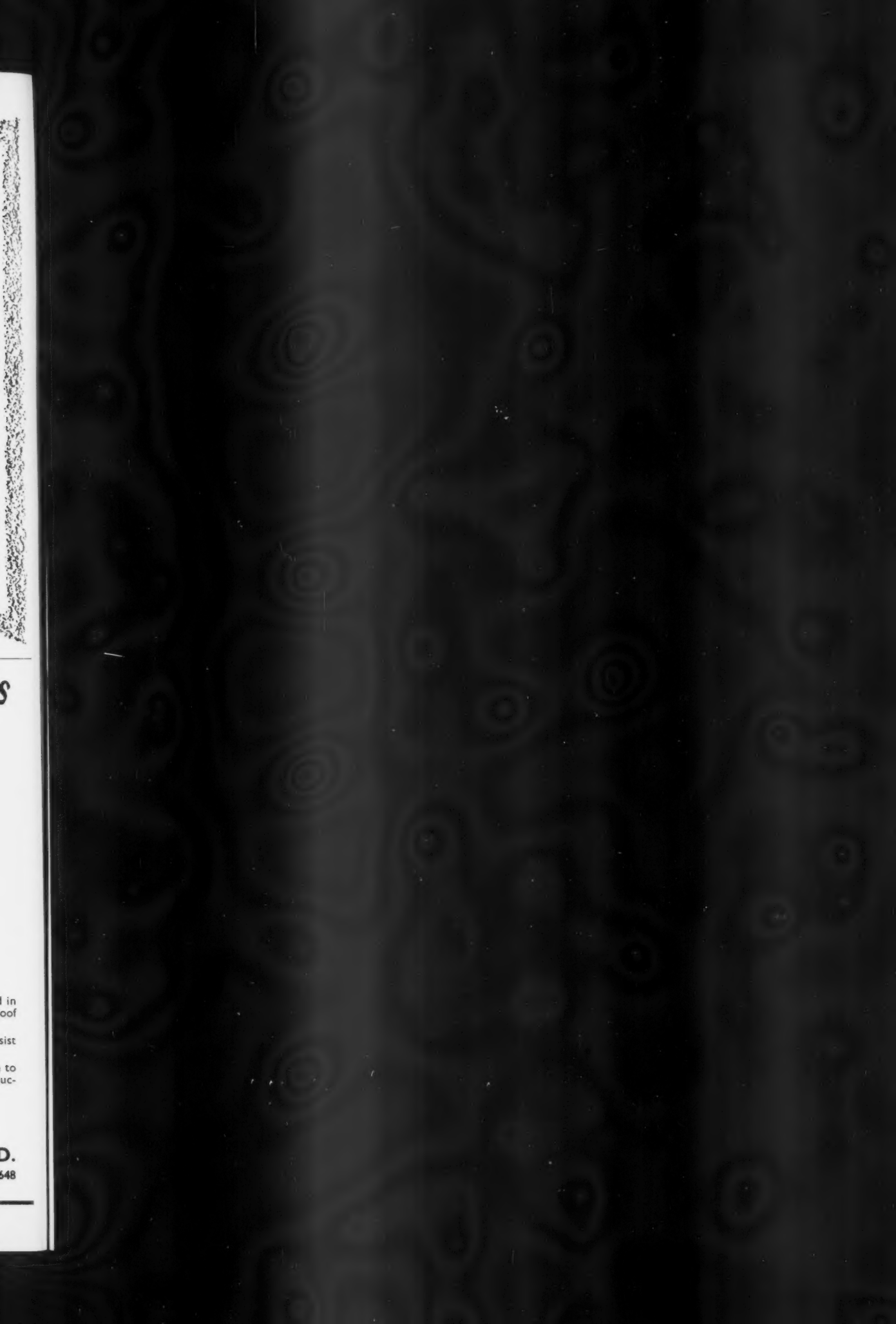

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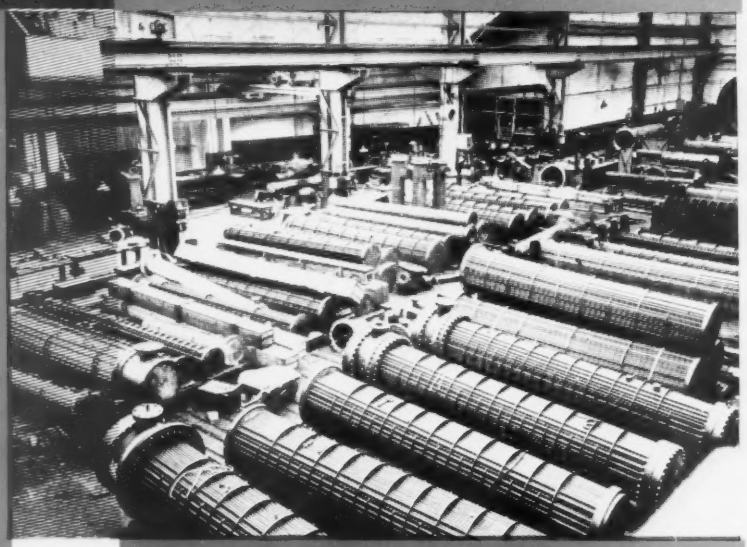

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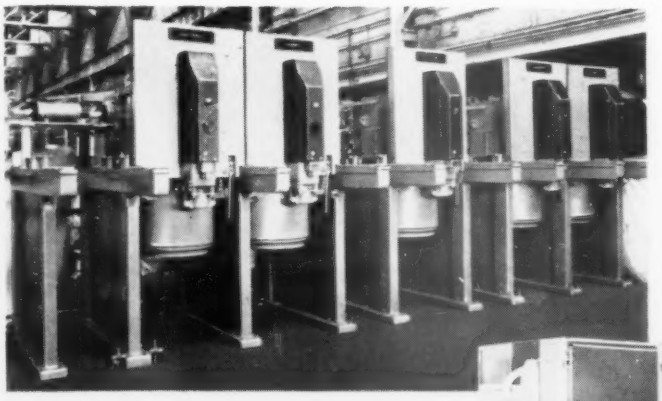
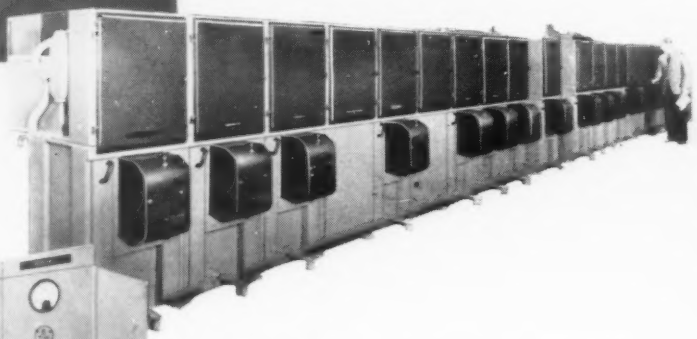
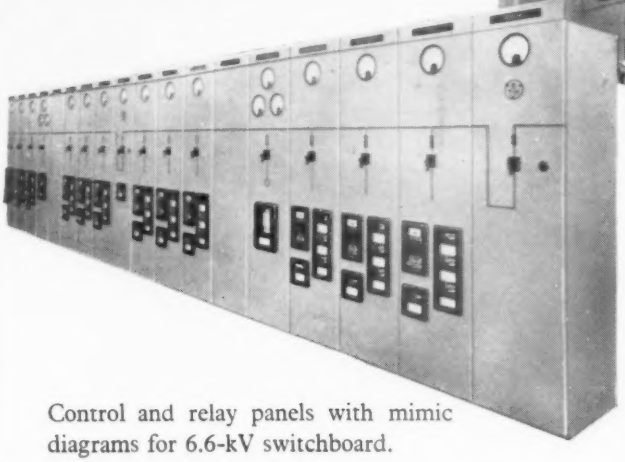


Five-panel, 22-kV, 500-MVA solenoid-operated switchboard for the control of the incoming feeders (from the Tata Power Co., Ltd.) and 7,500-kVA transformers which supply electric power to the whole refinery.



Twenty-panel, 6.6-kV, 250-MVA solenoid-operated switchboard controlling the 7,500-kVA transformers and main refinery feeders.



Control and relay panels with mimic diagrams for 6.6-kV switchboard.

Manufacture is now proceeding with a further two 22-kV, and nine 6.6-kV, units for a third 7,500-kVA transformer and additional refinery feeders; BTH have also supplied a total of eighty-three 6.6-kV, 150-MVA hand-operated metalclad switchgear equipments for the refinery substations.

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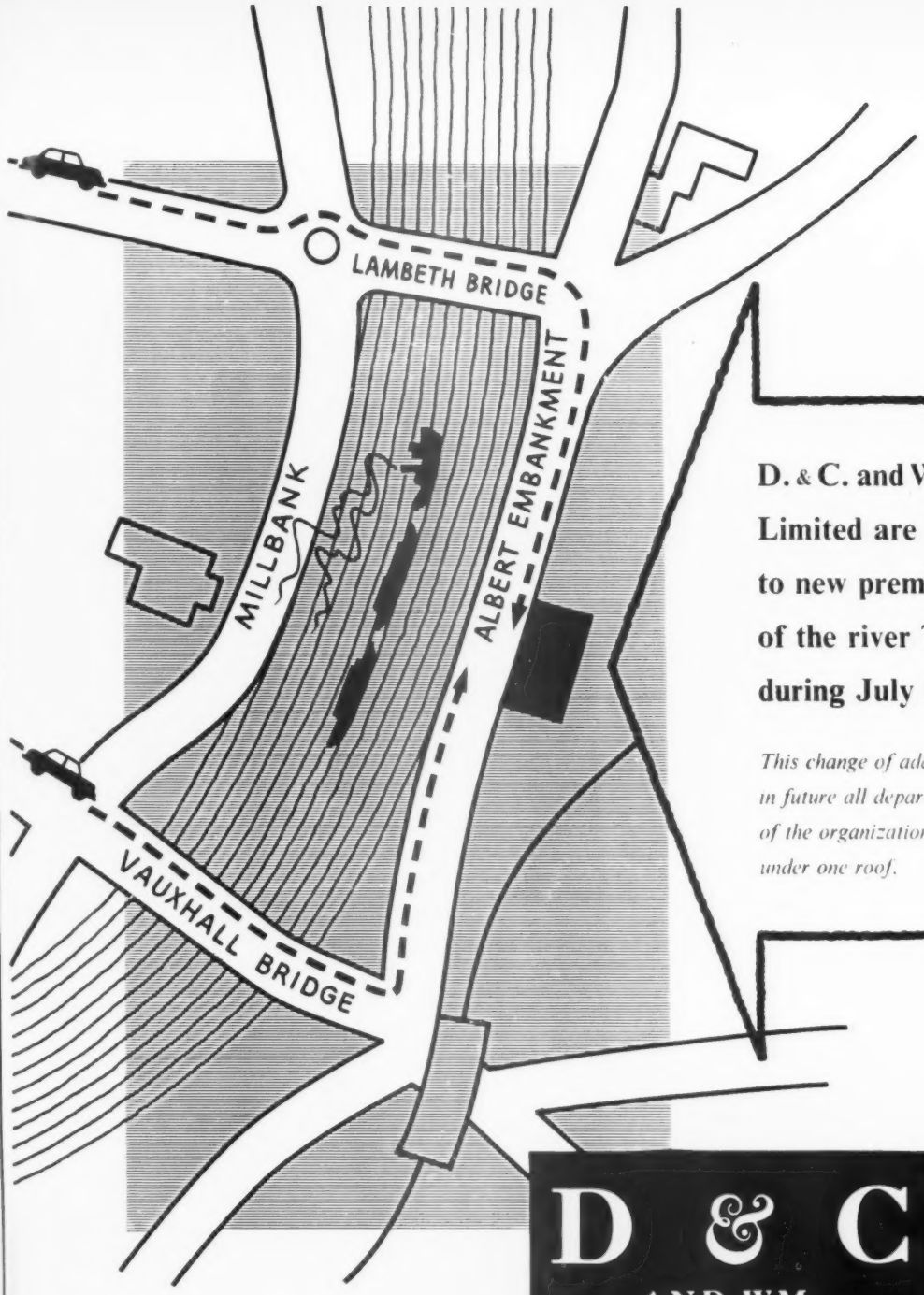

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Honorary Editor: E. B. EVANS, M.Sc., PH.D., F.R.I.C. *Hon. Associate Editor:* D. L. SAMUEL, B.Sc., A.R.I.C. *Editor:* GEORGE SELL

THE 1956 Summer Meeting, held at the Palace Hotel, Torquay, 6-9 June, was agreed by all who attended to have been a great success. It will be memorable on account not only of the papers and discussions in the technical sessions, but also as a most enjoyable social occasion.

Supporting the President, Lord Geddes, were Lt.-Col. S. J. M. Auld (immediate past-president); Dr and Mrs E. B. Evans and Mr and Mrs A. C. Hartley (vice-presidents); and M. E. Hubbard, Mr and Mrs H. Hyams, Mr and Mrs E. C. Masterson, Mr and Mrs T. W. Mathias, Mr and Mrs J. S. Parker, W. H. Thomas and Dr and Mrs C. G. Williams (Members of Council).

Total attendance was 134 and several members from overseas were present, including: Mr and Mrs L. A. Deelan (Holland), Dr A. L. Down (Trinidad), Mr and Mrs W. E. Gilbert (Holland), Mr and Mrs M. D. Jones (Kuwait), Mr and Mrs D. J. W. Kreulen (Holland), Mr and Mrs K. Lowes (East Africa), Mr and Mrs P. A. Marshall (Kuwait), and Mr and Mrs W. C. R. Whalley (Iraq). In a brief welcoming speech at the Cocktail Party which opened proceedings on the Wednesday evening, the President gave a special welcome to those who had travelled far or who had given up some of their leave to be present.

The Technical Sessions

The general theme of the eight papers arranged by the Papers Sub-Committee for the meeting was "Essential Factors in the Future Development of the Oil Industry". This theme was particularly appropriate at the present time because there is currently much interest in the problem of how the gap between the world's energy requirements and supplies is to be filled. It is also interesting to note that the report of the OEEC Committee (the Hartley Committee) on "Europe's Growing Needs of Energy. How can they be met?" was published on the day before the meeting.

In formally opening the meeting the President said that he was sure that all would benefit from the extremely interesting set of papers which they were to hear discussed.

The papers were then presented in three sessions.

The Energy Outlook

The first session, under the chairmanship of M. E. Hubbard, heard the following three papers:

The World Energy Outlook. By G. P. Glass and J. H. D. Page (*The Shell Petroleum Co Ltd*)

The Outlook for Atomic Energy. By C. M. Nicholls (*Atomic Energy Research Establishment*)

The Oil Demand Outlook. By C. P. Dalton and J. S. Senior (*Esso Petroleum Co Ltd*)

The first paper discussed in detail the future energy requirements of individual countries and of the world and concluded that, on a long-term basis, the growth rate for world consumption of primary fuels would be of the order of 3 per cent per annum. A graph indicated a rise from about 2700 million metric tons coal equivalent in 1955 to 5000 million metric tons in 1975. Within this world rate, coal consumption may be expected to grow at less than 1

Mr and Mrs Charles Kelly chatting with Dr and Mrs E. B. Evans.

per cent per year over the next 20 years, while the demand for oil and natural gas is expected to grow at the rate of 4 per cent per annum.

Mr Nicholls, dealing with the use of atomic energy for the generation of power, estimated that nuclear power stations with an electrical capacity of 50 to 100 kW may be in operation by 1975. He concluded by suggesting that, while there might be some local competition between nuclear energy and oil for base-load power station use, this on a global basis would not seriously affect the oil industry.

In the final paper of this session the authors dealt specifically with the demand for oil, and after examining the problem in detail, estimated world oil demand for oil in 1965 at 1050 million tons, with a reduction of 10 million tons if atomic power developed at the expense of oil. For 1975 the gross figure is 1560 million tons or 1400 million tons if atomic power makes its expected contribution.

Each paper was first discussed in detail and then followed a general discussion on the three papers as a whole. As the chairman said, in closing the session, the outcome of the various approaches to the energy problem was that for the next, say, twenty years, oil was the only fuel available

Esso in Conference *Mr and Mrs Clive Dalton, Mrs W. E. J. Brown, and Harry West.*

to fill the gap. The oil industry must, therefore, base its plans on the assumption that progress would continue at the highest speed known over any reasonable period of prosperity.

Oil Resources and Movements

For the second session, H. E. Barry took the chair and the first part was devoted to the consideration of the following papers:

Oil Resources in the Next Half Century.
By D. C. Ion (*The British Petroleum Co Ltd*)

The Changing Pattern of World Oil Movements.
By W. Jamieson (*The British Petroleum Co Ltd*)

In the absence of Mr Ion, who had left for Canada a few days before the meeting, the paper on resources was presented by M. H. Lowson. Mr Ion suggested that his paper be considered as a progress report in the necessarily continuous evaluation of future oil reserves. "Reserves" he classified as of three types—proven, probable, and ulti-

Mrs Glass, Mrs Kay, G. P. Glass, Mr and Mrs J. H. G. Carlile, Mr Kay, and W. Jamieson foregather for refreshment.

mate—all concerned with recoverable oil, and "resources" he defined as the recoverable oil which will eventually be produced to meet world demands.

Since 1859 the free world had produced 10,700 million tons (45 per cent from the U.S.A. and 11 per cent from the Middle East), while published proven world reserves at 1 January 1956 totalled 24,108 million tons (U.S.A. 17 per cent, Middle East 70 per cent). The author estimated that the free world requirement in 1975 would be 2035 million tons and outlined a possible pattern of production which indicated (in million tons) 900 from the Middle East, 450 from the U.S.A., 225 from the Caribbean, 185 from synthetics and natural gasoline. The pattern was then considered in detail in relation to individual areas.

Mr Jamieson, stating the basic pattern of world oil movement is of exports from production centres in each hemisphere to all parts of the world, pointed out that past changes in the pattern represented changes in the relative importance of the two centres. The most significant post-war change was in the flow from the east to the west and tabulated figures showed that such movement rose from 0·5 million tons in 1946 to 18·6 in 1955. In this same period

In spite of counter attractions all technical sessions were well attended.

the net west to east movement dropped from 31·9 to 12·3 million tons.

Turning to the future pattern of movements, Mr Jamieson indicated that in 1975 supply and demand would require movement of 1650 million tons, with the western hemisphere a net importer of 140 million tons from the eastern. At the end of 1955 the total tonnage dw of tankers of 5000 tons dw and over was 40 million, including 250 vessels of 24,000 tons dw or over. On order were 293 vessels including five of over 50,000 tons dw, two of which were of 83,000 tons dw.

Mr Jamieson then discussed the movement problem with particular reference to the Middle East and suggested that by 1975 there might be some 300 to 350 million tons of oil seeking passage through the Suez Canal. Possibilities of dealing with the problem were discussed. He concluded by estimating that during the next 20 years or so some 80 to 105 million tons dw of tankers would be required to carry the world's oil needs.

Extremely interesting discussions followed the delivery of both these papers and, as the chairman said at the conclusion of Mr Ion's paper, it seemed highly probable that in the year 2000 a similar audience would then find that there was still another fifty years' oil supply.

At the conclusion of the discussion on Mr Jamieson's paper the chairman referred to the points made in the paper and during the discussion on the problem of finding the steel needed to meet the demands associated with the expanded energy requirement. It was particularly important that the steel industry be made aware of the task before them. Also, he was equally sure that the shipping industry did not realize the magnitude of the problem which lay ahead.

Refining Techniques

The remainder of this second session was devoted to the presentation and discussion of:

Recent Developments in Oil Refining Techniques.
By A. L. Down (*Trinidad Oil Co. Ltd.*)

Dr Down first traced development in refinery techniques during the past hundred years and then discussed the increased flexibility afforded by modern catalytic processes. Catalytic reforming processes had been installed at rates never before known in peace time and the excess hydrogen from these processes had been fully made use of. In late 1955 there were 187 catalytic reformers installed, with a total capacity of over 1,300,000 barrels per day. This total included 169 platinum type processes with a capacity of over one million barrels per day.

Total world refining capacity at the end of 1955 was nearly 17 million barrels per day, of which nearly 11 million barrels was located in the Americas. The increase in

F. E. A. Thompson, I. Edeleanu, and H. C. H. Thomas (below, left) *and economists in session* (below, right): *H. E. Barry, M. E. Weinstein, J. H. M. Clark, P. M. de Veulle, and F. G. Thackeray.*

J. T. T. Robinson, Miss Newman, Lord Geddes, Mrs and Col. Oliver Sherlock, Mrs J. S. Parker, Mr and Mrs F. R. Newman, and Fred Trim.

current refining capacity was dealt with and Dr Down discussed the pros and cons of refinery location in relation to product markets or to producing fields.

Dr Down concluded by suggesting that the present annual rate of petroleum consumption is likely to be maintained for the next decade without any drastic change in the pattern of product distribution.

A useful discussion followed Dr Down's presentation of his paper.

Chemicals from Petroleum

The third and final session was under the chairmanship of George Glass and the first half was occupied with:

Oil's Future as a Source of Chemicals.
By W. D'Leny (*Imperial Chemical Industries Ltd*)

Dr D'Leny developed his theme from the viewpoint of the heavy chemical industry and outlined the development of the large-tonnage chemical industry from the late eighteenth century. The pioneers of industrial petroleum chemistry were the Mond brothers, who in the 1880's first produced benzol and naphthalene from crude oil in Baku.

The author then discussed various aspects of the production of chemical raw materials from natural gas and crude petroleum and briefly discussed the U.K. position. In fifteen years time half of the U.K. energy requirement would be derived from imported oil and so the chemical industry need have no inhibitions about basing its activities on oil. There would be ample feedstock to produce olefins to meet all visualized requirements and the organic chemist would have no difficulty in meeting the changing and unlimited demands for chemicals.

Finance

Having considered the need for oil, its place in the energy supply picture, its availability and its movement, as well as the products and chemicals to be obtained from it, it was logical that the final paper should be on the more mundane subject of finance. This paper was:

Financial Factors in Oil Development.
By P. M. de Veulle and F. G. Thackeray (*Petroleum Press Service*)

Pointing out that financial factors would play a major part in the prospective expansion of the industry, the authors referred to the fact that these growing capital requirements of the industry coincided with increasing demands for capital in every field.

The biggest demand for capital in the oil industry is for exploration and production and this, for the free world, is estimated to have amounted to about £1570 million in 1954. The rôle of capital in oil refining is indicated by the statement that between 1946 and 1954 U.S.A. refinery runs increased by 49 per cent, employment in refineries by only 12 per cent, but gross investment approximately doubled. Capital employed in the U.S.A. refinery industry

The Kuwait Oil Company was well represented at the meeting, their party being, from second left, E. W. Adams, E. C. Masterson, Mrs and Mr R. J. Holley, Mrs Adams, Mrs Masterson, P. A. Marshall, Mrs and Mr M. D. Jones, and Mrs Marshall.

to-day is about $30,000 per worker; in the U.K. about £15,000.

Outside the U.S.A. capital investment per ton of new annual capacity is of the order of £40 per ton. In the U.S.A. it is about £50 to £60 per ton.

Wide variations in cost are also evident in transport and storage and, while recent orders for 36,000-ton tankers in the U.K. show a cost of £50-£55 per ton dw, the indicated cost of an 84,000-ton vessel in Japan represents an outlay of about £37 per ton.

In the second part of the paper the authors discussed the source of new funds and the obstacles and aims to capital formation. In conclusion they said that the oil industry would inevitably have to rely predominantly on its own earnings.

A short but interesting discussion followed the presentation of this paper and thus ended what was generally agreed to have been one of the most useful and stimulating meetings that the Institute has held.

The Votes of Thanks

The Chair was then taken by Dr E. B. Evans, a vice-president of the IP and chairman of the Publications Committee. He expressed the thanks of all present to the authors of the papers, to the sessional chairmen and those who had contributed to the excellent discussions, and to D. A. Hough, the general secretary, and George Sell, the editor, for the efforts they had put into making the meeting so successful both socially and technically.

Old friends — A. Beeby-Thompson and George Sell.

Toasting time—T. Mathias, J. W. Vincent and Harry Hyams.

D. J. W. Kreulen (right) *from Holland and Mrs Kreulen* (left) *with Mr and Mrs A. Beeby Thompson.*

Shell and Shell-Mex and BP get together. M. E. Weinstein, Mr, Miss, and Mrs Harry Hyams, and Mrs Weinstein.

Dr Evans reiterated the President's remarks in welcoming the overseas visitors and expressed the hope that everyone would continue to enjoy the remaining social events of the meeting as much as they quite obviously had done so far.

Col. S. J. M. Auld, past-president of the IP, paid a tribute and proposed a vote of thanks to the members of the Papers Sub-Committee and their chairman, D. L. Samuel, for the extremely interesting and valuable material which they had produced for the meeting. Particular thanks were also due to G. P. Glass, who had worked so hard and contributed so much to the development of the theme of the meeting.

Social Events

Just about the only thing that marred the social scene at Torquay was the total absence of the sun. Fortunately, however, the weather was mainly fine and did not spoil either of the two excursions.

The visit to Buckland Abbey, the home of Sir Francis Drake, was a most enjoyable affair, and considerably enlivened by the incredibly skilful manœuvring of the three coaches over a fourteenth century bridge with literally half an inch clearance on each side of the low stone walls, with a roaring river forty feet below!

Buckland Abbey is a beautiful example of the Elizabethan Manor house, and everyone seemed to enjoy exploring the building and looking at the historical treasures and pictures.

A splendid Devon tea greeted members in what must surely be the largest tithe barn in the world, with a quite fascinating exhibition of horse-drawn, pedal, and hand-propelled vehicles.

Buckfast Abbey, which the ladies visited on the Friday afternoon, was a complete contrast, having been finished only a few years ago.

This lovely Abbey is a wonderful memorial to the faith and the courage of the monks who built it stone by stone, with their own hands, over nearly half a century.

Over the three days of the meeting several stern battles were fought out on the nearby golf courses, but the highlight was undoubtedly the golf competition played on the fascinating little hotel course after dinner on the Thursday evening. The main prizes went to J. T. T. Robinson, with a sparkling 22 net for the nine holes, Mrs D. A. Hough (23), and Mrs S. C. Wells (27), but the match which drew the entire gallery was the battle of the Presidents. This was played in faultless evening dress, and starting when it was almost dark finished in complete blackness, with the flagsticks illuminated by match light!

Buckland Abbey (above) *the venue of the main excursion*

Tea was served in the tithe barn (below) *outside which are seen Mr and Mrs T. Mathias, Mr and Mrs M. E. Weinstein, and Mr and Mrs H. E. Barry.*

J. T. T. Robinson receives from the President the prize for the best score (men) in the golf match, while D. A. Hough, the general secretary, looks on smiling

Photographs by G. Sell

Colonel Auld, it was alleged, defeated Lord Geddes by one hole, thereby winning the prize for the best round by a member who had not touched a club since 1926!

A very pleasant dinner dance ended the proceedings on Friday evening, when an excellent band played every type of music. It was particularly good to see A. Beeby Thompson demonstrating to the younger members just how the Gay Gordons should be danced.

Altogether it was one of the happiest Summer Meetings so far held, and the food amenities were of the highest standard. Perhaps the last line of a letter from one of our American members sums it up—"I did not feel at all like a foreigner because everyone was so pleasant".

Apart from the importance of the technical programme, there is no doubt that these meetings are extraordinarily friendly affairs, and a very good time was had by everyone who attended.

The Proceedings

The full proceedings of the meeting and the discussions on the papers will be made available in book form. Every endeavour is being made to have this book ready for publication before the end of September.

★ ★ ★

COMPATIBILITY TESTING OF LUBRICATING GREASES

Technical Committee G (*Lubricating Grease*) of ASTM Committee D-2 has approved the following statement:

Compatibility of lubricating greases implies compatibility in service. Owing to the complexity of service problems, there is no single test which can be used to satisfactorily evaluate compatibility in general.

Present ASTM methods, such as those for Dropping Point, Worked Penetration, and Leakage Tendencies of Automotive Wheel Bearing Greases, may be used to test mixtures of greases as well as to test individual greases. Results obtained on such mixtures, as compared to results on the unmixed component greases, are indicative of the compatibility of the mixtures. However, simple bench tests such as these must be correlated with a particular set of service conditions before a valid estimate of compatibility can be achieved.

Future of the Petroleum Industry in the U.K.

By C. P. DALTON (*Associate Member*)

This paper was read to a meeting of the London Branch on 23 May, 1956. Mr Dalton is on the staff of the Esso Petroleum Co Ltd.

Forecasting petroleum demand for long periods ahead is no longer a fashionable pastime; in the U.K. it has become a sheer necessity. There are two main reasons for this:—

First, there is the vast size of the growth involved. There is already a tendency to talk in terms of a market for petroleum in 1965 which may be at least twice the size of that in 1955. Including all the associated expenditure in the oilfields and on tankers, this expansion may cost £1000 million in new investment. This investment has to be financed, economically planned, and effectively developed in places as far apart as Kuwait and Southampton Water and in equipment ranging between pipelines and pipestills, supertankers, and rail tank cars. Incidentally, £1000 million is no more than the Coal Board is seeking to raise in the same period.

This massive investment which the oil industry will have to undertake leads to the second reason for long-range forecasting, namely planning. The petroleum industry achieves efficiency and flexibility partly because of its intensive use of capital; but large-size units, though reducing operating costs, tend to be specific, and to that extent must be planned with all the more care. Partly too, because of the close administrative links between all stages from the oil wells right through to the market. This close-knit chain from well to market, while making for greater smoothness in operations and for a flexible supply position, certainly complicates the planners' task. And the jig-saw is made more intricate still by changes in the market pattern—for instance, a disproportionately large increase in the demand for fuel oil makes it difficult to match the most economic pattern of refinery output against market demand.

One must remember that as well as investing in equipment, the oil companies will have to invest in men. This too means planning is wanted—to have time in hand for these men to be trained and for them to gain experience, and to allow time for company organization to be adapted to meet the operational and administrative requirements of the future.

Factors in Market Forecasting

The present generation is fortunate to be living in a period of economic growth and rising living standards. After the waste and stagnation of the inter-war years, the U.K. has entered into the third phase of the industrial revolution.

Automation (by which is meant a transition from men minding machines to machines minding machines) has functioned in the petroleum industry for some years but is now finding a more general application which will lead to increasing investment in all kinds of equipment. Government policies too are directed towards full employment of men and machines and one may look for a steady rise in industrial output over the years. It is possible that the country may catch up with Mr Butler's dream of doubling its standard of living in twenty-five years' time. But even if the post-war rate of progress only is maintained, living standards may have improved two-thirds by 1980.

Such great expectations are premised on an adequate supply of energy. It may be as well to recall that Britain's

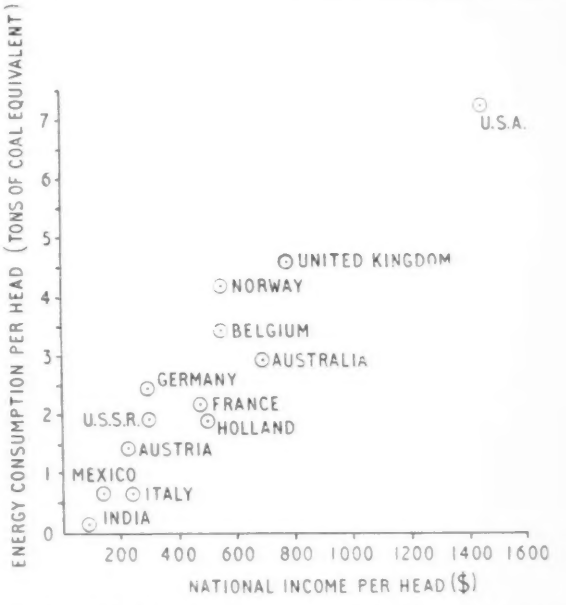


Fig 1. *Relation of energy consumption to national income per head.*

flying start in the industrial revolution was as much owing to accessibility of coal supplies as to the ingenuity of her inventors. In the same way, the spectacular progress subsequently made in the U.S.A. was in no small measure owing to its wealth in oil and natural gas.

There is, of course, a very close relation between energy consumption and industrial progress, as is shown in Fig 1 for various representative countries.

This diagram indicates how, as industrial production and economic activity rise, so do energy requirements increase. In the U.K. for instance, it has been estimated that a 5 per cent rise in industrial production is on an average associated with a 3 per cent rise in total energy requirements.

Although in the oil industry many different products are sold, most of them have two things in common: they are liquid and they provide energy. Liquidity gives oil an

edge over other kinds of fuel, in that for some uses, *e.g.* motor transport and aviation, it has no economic alternative, while in others its ease of handling and transport tends to give it an economic advantage over solid fuels. The fact that oil is a provider of energy means that it is sold in a market which is directly dependent on economic activity, and future increases in industrial production can be expected to lead to related increases in petroleum demand.

Products are, of course, sold which are not used as fuels, *e.g.* lubricants, solvents, bitumen, and chemical feedstock. Petroleum in these uses, particularly chemical manufacture, will undoubtedly grow in importance in the U.K., but even so, over the next decade or two, the volume of requirements will remain relatively small in relation to the demand for oil as a fuel. This paper is therefore confined to a discussion of oil in this latter use as provider of energy and, in this connexion, it is necessary to mention two points about oil's place in the U.K. economy.

The first is the obvious one that, historically, the U.K. is a coal-based economy. Until the beginning of the second world war the U.K. produced more than enough coal to meet all its needs, including a very substantial surplus for exports. In those days, oil by and large fulfilled those functions which coal could not, *e.g.* in motor transport and aviation, and, for the most part, oil did not compete directly with coal in the inland market. In consequence, the share of oil in the total energy picture was relatively small; and even to-day, though the share of oil is increasing, it is still less than in many other countries.

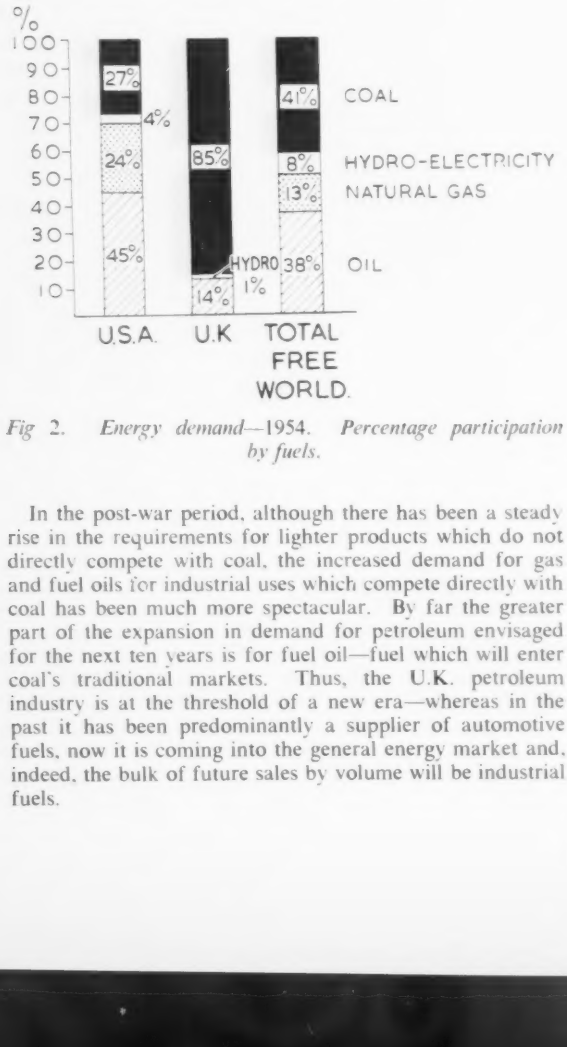


Fig 2. *Energy demand*—1954. *Percentage participation by fuels.*

In the post-war period, although there has been a steady rise in the requirements for lighter products which do not directly compete with coal, the increased demand for gas and fuel oils for industrial uses which compete directly with coal has been much more spectacular. By far the greater part of the expansion in demand for petroleum envisaged for the next ten years is for fuel oil—fuel which will enter coal's traditional markets. Thus, the U.K. petroleum industry is at the threshold of a new era—whereas in the past it has been predominantly a supplier of automotive fuels, now it is coming into the general energy market and, indeed, the bulk of future sales by volume will be industrial fuels.

Oil's Place in the U.K. Economy

Estimates of future energy requirements can be assessed fairly closely in total but the breakdown of the total between coal, oil, and atomic power is subject to wider error because of difficulties in assessing the rate of substitution between fuels. Accepting the error margin necessarily associated with estimates of oil demand in these circumstances, it appears that, as an industry, we are fortunate in that the trend rate of growth for our products is so strong that if even the estimates for 1960 are not achieved in that year demand will probably catch up a year or two later. Thus, the discussion centres around the year in which demand will double rather than whether it will in fact double at all.

Up to 1965 it is possible to reduce the possible range of error very considerably. First, some of the petroleum forecasts may be related directly to anticipated economic conditions and end use analyses without reference to coal supplies, *e.g.* motor fuels. Secondly, there are the commitments entered into by the oil companies as part of their contribution towards filling the energy gap, such as the contracts with C.E.A., who by the early 1960's will be using oil to the extent of about 6 million tons (9 million tons coal) p.a. There are also plans to increase oil consumption in the gas industry. Further, the Government is encouraging industrial consumers to convert from coal to oil, and the oil industry is expected to have to supply an extra 6 million tons of oil to such consumers over and above the additional fuel oil business it would have gained on normal trends. In fact, the total increase in sales of fuel oil alone by the early 1960's is put at 15 million tons. On the basis of these figures for fuel oil and projections of demand for other products, the potential inland demand for total petroleum products in 1965 may be estimated at 340 million brl or in terms of coal about 74 million tons.

The contribution from atomic energy will still be relatively small in 1965 when nuclear power stations should be saving about 5 or 6 million tons of coal. The coal saving from hydro-electricity may be put at approximately 2 million tons.

Thus, oil, hydro-electricity, and atomic power will be making a contribution to U.K. inland energy requirements in 1965 of approximately 82 million tons in terms of coal equivalent. By this year, inland energy requirements in total may have increased to 305 million tons, on the assumption that the established post-war economic trends continue. There would thus be a balancing requirement of 223 million tons from the coal industry.

TABLE I

U.K. INLAND ENERGY REQUIREMENTS

Million Tons Coal Equivalent

	1955	1965
Coal	215	223
Petroleum	34	74
Hydro-electricity	1	2
Atomic energy	—	6
	250	305
Petroleum—million brl	160	340

How do these estimates of inland coal requirements, which have been derived by treating coal as the balancing item in the total energy equation, square with present

knowledge of the forward supply position? In recent years the Coal Board has run into production difficulties, partly through manpower shortage and partly owing to the lag in development work because of the need to concentrate resources on immediate output. It is to give the coal industry a breathing space to get ahead with development and reconstruction that the Government are fostering the use of oil. The Board's latest investment plans are to raise the industry's capacity to 240 million tons p.a. by 1965 and 250 million tons by 1970, including continuance of open-cast mining to the extent of 10 million tons p.a.

It is necessary here to distinguish between capacity and output. Although capacity may be developed to 240 million tons by 1965, one may question whether actual output will fully reach this level. In addition to the difficulty of recruiting and training men in a period of full employment, when there are many equally or more attractive alternative jobs, it seems quite possible that the Board will have to face persistent demands for such benefits as a shorter shift, an extra week's holiday, stricter enforcement of safety regulations, and so on—all of which may subtract from output. There is also their effect on costs to be taken into consideration and, on present trends, it seems likely that fuel oil will tend to become increasingly competitive with coal on price.

If the output is attained, however, it will leave a welcome margin for exports—17 million tons in 1965 on the assumption of 223 million tons needed for the home market.

When examining the prospects for 1975 the picture is less clearly defined, although there will undoubtedly be a significant increase in oil requirements.

There are several reasons for uncertainty in the longer term. Dealing firstly with demand, forecasts of energy requirements for a period twenty years ahead are of necessity subject to a wider margin of error than those for ten years ahead. On the assumption of continuance of trend, total energy requirements in 1975 would be 360 million tons coal equivalent compared with 305 million tons in 1965 and 250 million tons in 1955. It is quite possible, however, that the growth rate for energy may increase, reaching perhaps 380 million tons by 1975. Such an acceleration might follow from a development of automation leading to higher productivity and based on an increasing use of energy. In addition, as disposable income per head—or the standard of living—continues to rise, it might be reasonable to expect a more than proportionate increase in energy demand, as a greater share of income became allocated to improved personal comforts, such as higher standards of house heating and more widely spread car ownership and use.

For present purposes, it seems reasonable to take the mean between 360 and 380 million tons and to assume that energy requirements in 1975 will be 370 million tons coal equivalent.

On the supply side:

(a) If the Government's plans for nuclear power stations go to schedule the contribution from this source will have reached the equivalent of 40 million tons of coal by 1975.

(b) Hydro-electricity will be contributing perhaps the equivalent of 3 million tons of coal.

(c) The possible increase in coal availability and usage on the U.K. home market between 1965 and 1975 is difficult to forecast. By 1970 the Coal Board hope to have a capacity of 250 million tons p.a. Actual output may be somewhat less than this and inland coal consumption might range between 230 and 240 million tons depending on home demand and the export markets.

On these assumptions, coal, atomic power, and hydro-electricity would be contributing 273 to 283 million tons of coal equivalent to a total requirement of 370 million tons.

Treating oil this time as the balancing item, this would imply a demand for oil equivalent to 87-97 million tons of coal or about 400-450 million brl.

As Fig 3 shows, these estimates indicate some slowing down in the rate of expansion of oil demand, after the extremely rapid rise from 160 million brl in 1955 to 340 million brl in 1965; but there will still be scope for a very considerable increase in sales in this latter period. It is necessary to stress that the figures for oil are conservative in that oil has been treated as the balancing item, thereby absorbing the impact of the development of atomic power.

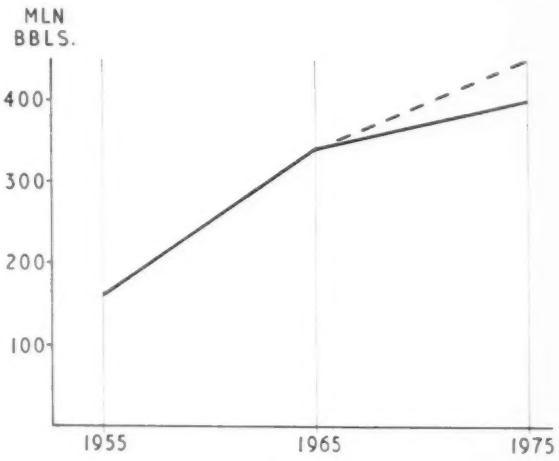


Fig 3. Possible level of demand for petroleum in the U.K.

All this is, of course, necessarily conjectural. The purpose of the estimates is to indicate the broad trend of events and in particular to show that the development of atomic power in the U.K., even on conservative assumptions, does not imply a cessation of oil industry expansion.

Throughout this paper there is the tacit assumption that oil would be imported to fill the energy gap rather than coal. Theoretically, of course, it would be possible to import coal, although there is a physical limit set by the receiving capacity of U.K. ports, which are not set up to handle coal inwards from the large ships which make transatlantic transportation an economic proposition. Admittedly, in 1955, the U.K. imported 12 million tons of coal, much of which was transhipped at continental ports, in order to be able to fulfil the coal export commitments. But this was only a temporary expedient; the Government are cutting coal imports in 1956 by a half and hope to eliminate the need for them. The fact is that coal imported at £7 15s. 0d. a ton c.i.f. costs considerably more than fuel

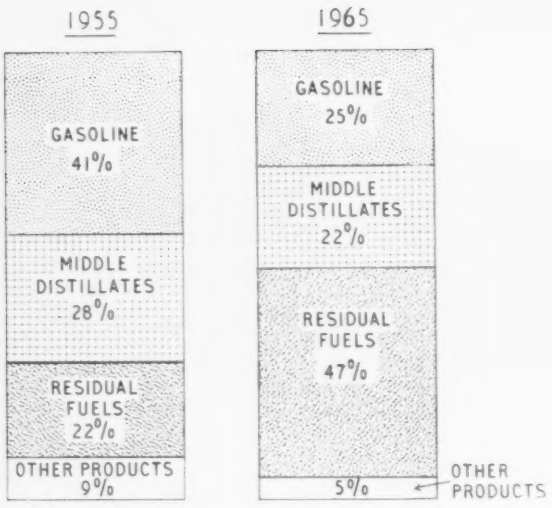


Fig 4. U.K. pattern of inland product demand.

oil, after allowing for the higher calorific content of the latter, and is also sold at a loss of over £2 a ton compared with the U.K. market price for coal. Moreover, much of the coal imports have had to be obtained from dollar sources, whereas the bulk of the petroleum industry's requirements is currently drawn from predominantly sterling sources.

It seems reasonable to assume, therefore, that imported petroleum will be used to fill the energy gap. There are obvious advantages in importing petroleum in the form of crude for processing in U.K. refineries and at this point it is necessary to return to the problem of refinery balance, referred to earlier. Fig 4 shows how the proportion of light fractions and middle distillates in the total U.K. demand for petroleum is likely to fall appreciably between 1955 and 1965, because the expansion in demand will be mainly in fuel oil. This means that the market pattern will get out of balance with the economic pattern of conventional refinery production, and highlights the need to radically change the pattern of refinery production to give greater emphasis to fuel oil. It will undoubtedly be possible to go some way towards meeting the new demand pattern by changes in yields and in the types of crude run, but refinery economics and the availability of heavy crudes may limit the extent of changes on the supply side. On the demand side, one may perhaps be allowed to persist in the hope that some reduction in the discriminatory taxation on motor gasoline may permit a more normal development in the market for this key product.

To summarize the foregoing views on the future of the petroleum industry in the U.K.:—

(1) Petroleum is rapidly widening its market basis, and there is every prospect that, by 1965, the demand for fuel oils will outpace the demand for all other products combined.

(2) Overall, the market for petroleum is expected to double within the next decade.

(3) Thereafter, the growth rate may show some slackening with the development of atomic power, but the U.K's energy requirement is such that relatively peaceful co-existence should be possible between coal, oil, and the atom.

(4) It is all going to need a lot of money. As mentioned at the beginning of this paper, a rough estimate is £1000 million capital to meet the extra demand between 1955 and 1965; some of this money will have to be borrowed, but most of it will have to be found from the industry's own earnings.

NEW HOME OF THE IP

Work is now proceeding on the rehabilitation of the Institute's new premises at 61 *New Cavendish Street* (left). Above *is the scene in the area which will eventually be a lecture theatre of ample proportions for the monthly and similar meetings. This area will also contain a canteen for the serving of refreshments and adequate cloak-room and similar facilities.*

Visit of Parliamentary and Scientific Committee to Sunbury

A party of members of the Parliamentary and Scientific Committee visited the BP Research Station at Sunbury-on-Thames on 20 June, Mr W. H. Catchpole, the chief chemist, welcomed the party on arrival and explained the work of the station. The party then toured the laboratories. The photograph shows (left to right) *M. L. Bingham (Sunbury); A. H. T. Chisholm (Head Office); W. M. Catchpole (Sunbury); Sir Hugh Lucas-Tooth, M.P.; Sir Fergus Graham, Bt., K.B.E., M.P.; Prof. I. Melville, D.S.I.R.; Dr D. Mc. I. Johnson, M.P.; N. W. Pirie (Assn of Scientific Workers); J. Arbuthnot, M.P.; Lt.-Cdr. S. L. C. Maydon, M.P.; R. Greatorex, M.P.; Prof A. R. Ubbelohde (Faraday Society); Dr L. B. Witten (Sunbury); T. Dewhurst (Institute of Fuel); E. A. White (Sunbury); J. G. Withers (Sunbury); C. L. Bailey (Sunbury); A. Laird (Head Office); and F. E. A. Thompson (Head Office).*

Energy and World Development

In his Presidential Address to the Fifth World Power Conference, in Vienna, on 17 June, Sir Harold Hartley said six years had elapsed since the Plenary Meeting in London, and in those years much had happened. In this modern world, energy, directly or indirectly, was playing a vital part and often it may prove to be the limiting factor in development. There were many others—water, fertile soil, raw materials, manpower and skill, and capital investment—but in all of them energy was an essential factor. There was also a growing awareness of the need of energy, a growing anxiety in many countries as to how those needs could be met.

Sir Harold then explained how the discovery of the possibility of harnessing nuclear energy had come at a most timely moment. The nuclear energy available in uranium and thorium had multiplied the energy resources of the world many fold, and would in time make ample supplies of energy available at places where the cost of transport of traditional fuels might be prohibitive. But nuclear power was still in an early stage of experimental development and no one could predict with certainty what form it ultimately might take.

In regard to electricity, Sir Harold said the demand was growing continuously and by 1975 perhaps as much as 50 per cent of the intake of energy would be in this form. Nuclear power stations would soon begin to take the place of the fossil fuels—coal, oil, and natural gas—now being burnt under boilers, when these will be needed badly for other purposes, for many of which nuclear power could not replace them. For one thing was certain—with the hunger for energy every form that could be used economically will be required.

Finally, Sir Harold said food was the most urgent need of the world to-day, and he asked whether enough thought was being devoted to the place of power in agriculture as compared with the emphasis which is placed on industry.

Gas Chromatography

The IP Hydrocarbon Research Group Symposium

Such is the interest in chromatography that this year's symposium of the IP Hydrocarbon Research Group, on the subject of Vapour Phase Chromatography, attracted a record attendance during its sessions from 30 May to 1 June. On the opening morning registrations had reached the figure of 375, and the organizers were recording new members throughout the meeting until the final total of 392 was reached.

In order to give the delegates, who represented almost every industry and a large number of companies, research organizations, and universities, an opportunity to meet, a reception and buffet supper was held at the Rembrandt Hotel, London, on the evening of 29 May. The value of this was obvious to all who attended. Old acquaintanceships were renewed, new friends were made, and those working in the

"Getting together" was a function of the reception preceding the conference, as is illustrated here.

field of chromatography were enabled to meet socially their colleagues from other parts of the country or of the world before joining issue with them on technical matters in the meeting hall on the following days.

Venue of the symposium was the lecture theatre of the Institution of Electrical Engineers, and it was opened by Dr J. W. Barrett, chairman of the Hydrocarbon Research Group, who briefly recounted the organization of the Group. This Symposium, he said, had been organized by the Hydrocarbon Chemistry Panel of the Group, and the Chairman of that Panel—Dr S. F. Birch—and his colleagues were to be congratulated on having brought together this large gathering.

The subject was treated in six morning and afternoon sessions of 3½ hours each. Chairmen of the six sessions were:—

Dr A. J. P. Martin	Consultant
Dr C. S. G. Phillips	of Oxford University
Dr A. T. James	of National Medical Research Institute
Prof R. M. Barrer	of Imperial College, London
Dr A. I. M. Keulemans	of Koninklijke Shell Laboratorium, Amsterdam;
N. H. Ray	of I.C.I. Ltd, Alkali Division

In general the first two sessions dealt with theoretical aspects of chromatography, the remaining four dealing with the practical applications. In the theory section an opening paper was read by Dr A. J. P. Martin and nine papers on factors affecting the art were then presented and discussed.

The introductory paper in the practical section was prepared and read by Dr A. T. James, the number of papers which followed totalling twenty-five.

Throughout the proceedings, discussion was brisk and to the point, particularly on questions of application of the method and design of apparatus. There is no doubt that the report of the symposium will add much to the knowledge of this new art in the analysis of mixtures.

The meeting was closed by Dr B. W. Bradford, who expressed thanks to the Organizing Committee and officials for the considerable effort that they had made to achieve such an outstanding success. He commented on the liveliness of the discussions to which the overseas visitors had made such valuable contributions.

Recommendation

As a result of the conference various recommendations were made by a special Committee. Those concerning nomenclature are:—

(*a*) That the term *gas chromatography* be used to describe all chromatographic methods in which the moving phase is a gas. That the term *vapour phase chromatography* be no longer employed.

(*b*) That the term *gas-liquid chromatography* be used to describe all gas chromatographic methods in which the fixed phase is a liquid (distributed on an inert support).

(*c*) That the term *gas-solid chromatography* be used to describe all gas chromatographic methods in which the fixed phase is a solid (*e.g.* charcoal, zeolites).

Other recommendations concerned the determination and expression of retention values, the expression of column resolution, and the expression of detector sensitivities.

Dr J. W. Barrett (right) *and Mrs Barrett at the reception.*

The Exhibition

In connexion with the meeting a small exhibition of apparatus was arranged. The exhibits included gas chromatographic instruments manufactured by Messrs Griffin and George Limited, Metropolitan-Vickers Electrical Co Ltd, Perkin-Elmer Corporation, and Casella Instrument Co, and a Katharometer by W. G. Pye & Co Ltd.

Dr B. W. Bradford (left) *with some of the Organizing Committee, G. Sell, Mrs and Dr S. F. Birch, and D. H. Desty.*

Personal Notes

T. W. W. **Thompson,** manager of Mobil Oil Co's retail merchandizing department, celebrated 30 years service with the Company on 31 May. At a luncheon in London, attended by many of Mr Thompson's closest friends, he was presented with a pair of inscribed cuff-links.

W. **Domzalski** has been appointed chief geophysicist of Hunting Geophysics Ltd. His first concern will be the interpretative side of the geophysical work, and, later, he hopes to carry out a large proportion of the general technical administration.

Clyde H. Britten, Arthur O. Willey, and **James N. Crawford,** three associates of the Lubrizol Corpn, have recently been appointed to the Board of Anglamol Ltd.

F. Alex Nason, who was an original director of both Lubrizol and Anglamol, now becomes Chairman of Anglamol.

Dr Forrest F. Musgrave and **Alfred Towle** have been appointed co-managing directors of Anglamol. In his new position, Mr Towle is in charge of the company's laboratories at Hazelwood, nr Derby. Dr Musgrave will continue in charge of the company's sales activities.

F. N. S. Evans, former manager, Midland Branch, has been appointed fuel oil manager of the Regent Oil Co Ltd. Mr Evans joined Trinidad Leaseholds (now Trinidad Oil Co) in 1933. In 1945 he became district manager of the Petroleum Board in Lincolnshire, and in 1949 was appointed manager of the NW Branch of the Regent Oil Co. Two years later he became manager of the Midland Branch.

N. Craven-Jones, who also joined Trinidad Leaseholds in 1933, has been appointed manager of the Midland Branch. He was formerly deputy manager of the Southern Branch.

L. S. Musgrave, assistant marine manager, has been appointed deputy marine manager of the Esso Petroleum Co Ltd.

L. S. Musgrave

F. H. Mee

P. R. Fairbairn

F. H. Mee and **P. R. Fairbairn** have been appointed assistant marine managers of the same company.

J. G. O. Pratt, one of BP's geophysicists, has been seconded to the British Trans-Antarctic Expedition and will leave for the Antarctic in November to accompany the party which will attempt to cross the Antarctic continent via the South Pole. As the expedition's geophysicist, he will carry out gravity and seismic work, using equipment provided by BP.

As mentioned in the July issue, Mr Pratt recently participated in tests in Norway on the Expedition's Sno-Cat tractors.

Captain S. D. Bumstead, O.B.E., who joined the British Tanker Company (now BP Tanker Company) in 1920, has been appointed Commodore with effect from 1 July. Captain Bumstead has served in command of a number of the Company's ships, his last appointment being the 32,000-tons dw *British Soldier*.

E. H. O. Elkington, M.C., has retired from the Board of The British Petroleum Co Ltd. He is succeeded by **Robert Gillespie, C.B.E.,** who has been appointed a managing director to fill the resulting vacancy. Mr Elkington joined BP (then Anglo-Persian Oil Co Ltd) in 1921. After three years' service in the oilfields in Persia, he became assistant general manager at Abadan in 1924 and from 1929 to 1937 was general manager in Persia and Iraq. In 1937, he joined the Company's head-office management in London, being appointed a managing director in 1947.

Robert Gillespie joined the British Tanker Co (now BP Tanker Co) in 1922. After working in the marine and ship management departments, he became personal assistant to the general manager in 1935 and chief management assistant in 1937. Seconded to the Ministry of War Transport as assistant director of the tanker division from 1942 to 1943, Mr Gillespie was appointed general manager of the British Tanker Co in 1944, becoming a director in 1946 and managing director in 1950.

He has now resigned his appointment as managing director of the British Tanker Co Ltd but continues to serve on the board as a director.

R. Gillespie, C.B.E.

D. G. L. Bean

J. Houston Jackson, who was appointed general manager of the BP Tanker Co Ltd in 1952, has now also been appointed a director. **D. G. L. Bean,** who has been transferred from BP Trading Ltd, has been appointed deputy general manager of the BP Tanker Co Ltd.

John C. Jewell, who as reported in our May issue is leading the British Andean Expedition in Peru, writes on June 21 that all is going well and that the expedition is finding much to interest them.

Around the Branches

BAHRAIN, FAWLEY, KUWAIT, LONDON, NORTHERN, SCOTTISH, SOUTH-EASTERN, SOUTH WALES, STANLOW, TRINIDAD

South-Eastern Branch

On 16 June, sixteen members of the SE Branch visited the South-Eastern Gas Board's works at Gillingham and were given a thorough insight into the workings of a modern gasworks, from the arrival by barge of Durham coal to the final distribution of town gas.

Gillingham gasworks, which covers an area of 11½ acres, contains 76 continuous vertical retorts in nine settings, having a consumption of some 250 tons of coal per day with a gas output of 4 million cu. ft.

An inspection was made of the water gas plant, which has a capacity of 1·1 million cu. ft. per day, and the washery, which renders the raw gas free from tar, benzol, sulphur, etc.

The party were shown the up-to-date coke grading unit erected in 1953 which is capable of handling 80 tons of coke per hour.

Tea was taken in the staff canteen where thanks was paid to Mr Skinner, Station Engineer, and his staff for a most instructive visit.

South-Eastern Branch Dinner-Dance

Among the more enjoyable gatherings of the IP Branches are the annual dinner-dances which most of them organize. In fact they are looked forward to each year for a real get-together of old friends and the making of new ones. The one arranged by the South-Eastern Branch is no exception to this rule and therefore members of the Institute in the London and south-eastern area are advised to take early steps to procure tickets for this year's Dinner and Dance of the South-Eastern Branch on Friday, 19 October, at the Tudor House, Bearsted, near Maidstone.

The Tudor House, located on the main London-Folkestone road (A20), is only 4 miles east of Maidstone. Not only has it one of the best dance floors in the area but it is also situated in beautiful country surroundings.

Arrangements are for dinner 7.30 for 8 p.m. followed by dancing until 1 a.m. Tickets are £1 1*s*. each and tables for parties of four and eight can now be reserved. As tickets are already well in demand early application is desirable and should be sent, with remittance to the Branch Secretary, J. R. Moore, c/o Fisher Governor Co Ltd, Airport Works, Rochester, Kent.

Trinidad Branch

The second Annual Stableford Golf Competition was held on the Trinidad Oil Co Ltd's course at Pointe-à-Pierre. The winner, C. O. Camps, was presented with the cup given by Mr Godfrey of Shell, Trinidad. Leading scores were as follows:—

C. O. Camps	...	...	36
J. L. Deal	...	...	33
W. S. Fulton	...	...	32
G. S. Sommerville	...	...	30
G. E. Higgins	...	...	29
J. A. Hulme	...	...	29
D. B. Thomas	...	...	29

The prize for the best nine holes was awarded to J. L. Deal (20), the runner-up being C. O. Camps (18).

London Branch Summer Visit

Saturday, 16 June dawned with leaden skies and steady rain, so breaking the remarkable record of brilliant weather enjoyed by previous summer visits of the London Branch. However, the weather was no deterrent to a surprisingly large number of members of the Branch who boarded the M.V. *Ford Consul*, moored beneath the dripping trees at Charing Cross pier for the trip to the Coryton refinery of the Mobil Oil Co Ltd.

Once under way "up spirits" was piped, or in "land lubbers' " words, the bar was opened, and in the convivial if crowded atmosphere of the two saloons everyone soon forgot the rain outside.

"Sailing down the river" with the London Group Summer Visit: (left) *J. H. Curtis, J. C. Richards, G. J. O'Connell,* (centre) *Peter Gibson, Mr and Mrs W. H. Davies,* (right) *Dr F. Sager, B. S. Brailey, E. Thornton.*

After a four-hour journey, during which an excellent lunch was served on board, members were "discharged" at Coryton jetty where, after negotiating a swaying walkway in a high wind, the party set foot once more on what would normally have been called "dry" land and embarked in coaches for the refinery administrative offices. Here, C. Walbancke gave a most lucid and interesting description of the refinery organization. The party then divided into three groups and made a general tour of the refinery, including the power house, the T.C.C. unit, the jetty, and the lubricating oil plants.

After taking tea in the refinery canteen the chairman of the Branch, Ronnie Leach, thanked the refinery staff for a most enjoyable and interesting afternoon and expressed the Branch's appreciation of the kind hospitality of the Mobil Oil Company.

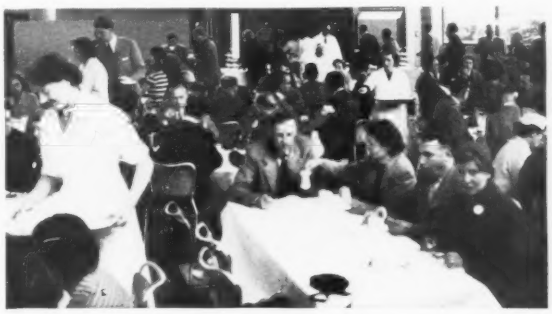
The party then returned to London by coach and all agreed that, in spite of the weather, the visit had been a great success; only one minor disappointment was heard! A lady member regretted that she had not seen the famous stables where the "Flying Horses" were reared!

London Branch Committee

Recently the London Branch Committee has elected its officers for the 1956-7 Session and these are:—

Chairman	R. F. Leach
Vice-chairman	J. C. Jewell
Secretary	S. C. Price
Treasurer	H. S. Kierman
Chairman of Programme Sub-Committee	J. H. M. Clark

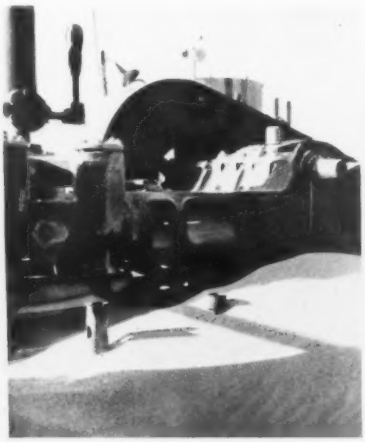
Other members of the Committee are: W. D. Davies, W. H. Davies, N. E. F. Hitchcock, C. J. McManus, and N. E. Walters. The Programme Sub-Committee members are W. D. Davies, W. H. Davies, and N. E. Walters. The vice-chairman of the Committee is also an ex-officio member of the IP Council.



Meal-times on the London Branch Summer Visit

(Above) *Lunch on the gallant ship* Ford Consul *and* (below) *tea in the very fine staff canteen in Mobil Oil Company's Coryton refinery.*

SAND STORMS IN KUWAIT



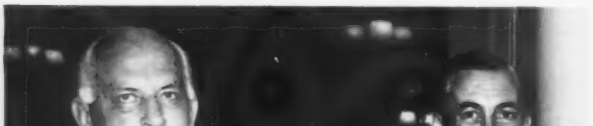
Photos by H. A. McMeredith and (*centre*) Kuwait Oil Co Ltd.

During the first ten days of June 1956 *Ahmadi experienced one of the worst sand storms, locally known as "shimals", within living memory. Drilling operations had to close down completely and, during the period* 3 *to* 5 *June, almost one hundred per cent working time was lost on all rigs. Additional time was also lost during the following few days due to the necessity of cleaning machinery after the storm had abated. The sand hung in the air like a pall, and visibility was reduced to a very short distance in many areas.*

Trinidad Branch Annual Dinner

The 18th Annual Dinner of the Trinidad Branch was held on 28 April at the Queen's Park Hotel, Port of Spain.

In a speech proposing the health of the Institute of Petroleum which he coupled with the continued prosperity of the oil industry in Trinidad, His Excellency the Governor, Sir Edward Betham Beetham, K.C.M.G., C.V.O., O.B.E., said it was a terrifying thought to imagine what would happen to the island's economy if the oil wells suddenly ceased to flow and the refining activities ended. Thirty-six per cent of the Government's revenue would at once be cut off and 20,000 people now working in the industry would become unemployed, besides large numbers of others whose livelihood



Sir Edward Betham Beetham, Governor of Trinidad and Tobago, with J. A. Hulme, chairman of the IP Trinidad Branch.

also depends on oil. What this would mean in reduced salaries and wages, lower standards of living, and general economic distress could be left to one's imagination. The fortunes of the oil industry were therefore of great concern to both the Government and the people of the Colony.

Challenge to the Institute

Trinidad's contribution in terms of world production was however very small and it could readily be replaced. It was therefore necessary to "tackle vigorously the problems of new sources of crude oil, better methods of recovery, new refinery processes, as well as the latest developments in the petroleum chemical industry." In all these matters the Institute had a big role to play, and he was confident that it would rise to the challenge of these and all the other problems which world competition involved.

The Governor hoped that recently approved depletion and other allowances would prove a great stimulus to the development of marine drilling. He also said that it was very gratifying to learn that a large gas field had been discovered in the Penal-Barrackpore area and that there is an even larger gas reserve in the northern basin of Trinidad. It was anticipated that these potential sources of industrial power would be given sufficient publicity to attract industry and capital from outside the Colony.

Finally, the Governor congratulated the Institute on the valuable work it was doing and wished it every success in the coming year.

The Chairman's Review

In a speech welcoming the Governor and reviewing the activities of the past year the Branch chairman, J. A. Hulme, said that members of the Branch had attended and presented papers at the Fourth World Petroleum Congress. They had also presented geological papers at conferences in New York and the Caribbean. "These contributions to international conferences," said Mr Hulme, "are a real tribute to the technical ability of the Trinidad oilman."

Frank Dabell

Mr Hulme went on to say it was with deep regret that members had learned recently of the death of Frank Dabell, who in 1928 was the instigator and chairman of the Trinidad Branch. The industry and the Institute were grateful for his pioneer work.

Local Membership

Plans for expanding the Branch by admitting local membership had now received the approval of the parent body and would be introduced in the near future.

The Industry

Mr Hulme maintained that the oil industry in the Colony is such a large economic factor that Government revenue, commerce, and the standard of living for the peoples of Trinidad depended on whether it continued to thrive and prosper.

In regard to the demand for oil in the U.S.A., Mr Hulme said that there had been a steady annual increase of about

H. C. Costello (Branch Committee Member), J. Mowll (general manager, Apex Trinidad Oilfields Ltd), Hon. A. Gomes (Minister of Labour, Industry, and Commerce), G. L. Reid (general manager, Shell Trinidad Ltd), Hon. Ellis Clark (acting Attorney General), J. B. Christian (general manager, The Trinidad Oil Co Ltd).

Count Finbar Ryan, R. Lange (president, Port of Spain Chamber of Commerce), and (in foreground) *J. L. Deal (hon. secretary, IP Trinidad Branch).*

6 per cent. With current requirements of about 8 million barrels per day, and assuming that war and major economic disturbances did not retard the increasing demand, it had been predicted that by 1965 the U.S.A. would require some 13 million barrels per day, which was equivalent to approximately six months production from Trinidad.

It was further estimated that American production of crude oil, which at present was about in balance with requirements, would be unable to meet the increased demand, and would show a deficit of about 3 million barrels per day by 1965.

Excluding America and the Russian dominated territories, Mr Hulme said the demand for oil was increasing at the rate of about 11 per cent per year, the current consumption amounting to approximately 6 million barrels per day and by 1965 would be of the order of 12 million.

Despite major increases expected in the production of crude from Venezuela and Canada, Mr Hulme said the bulk of the increase, some 5 million barrels daily, would come from the Middle East. "That is why political affairs in the Middle East," he said, "are of such vital importance to-day. These countries are close to the Russian sphere of influence, and the future of the world may well lie hidden in these desert sands, over which, before their commercial wealth was realized, men have fought for thousands of years."

In regard to the U.K., Mr Hulme said that petroleum requirements had increased by about 90 per cent in the past five years. Such an expanding market presented a wonderful opportunity for Trinidad but with U.K. annual requirements amounting to 270 million barrels Trinidad's total crude oil production could meet only about 10 per cent of that demand.

Production Requirements

In order to maintain production in Trinidad at its present daily level of 69,000 barrels Mr Hulme said that 250 wells would be drilled in the coming year. This, compared with the 90 wells which are to be drilled in the Middle East to meet the increased demand for oil, showed "the disparity of effort which must be made by the Western world."

Mr Hulme said that Trinidad crude oil production was now less than one half per cent of the world's total production, and if it were no longer available would scarcely be missed. It was therefore his firm conviction that "the future of Trinidad's oil lies in the further development of its refining industry and petroleum chemical productivity."

The Refining Picture

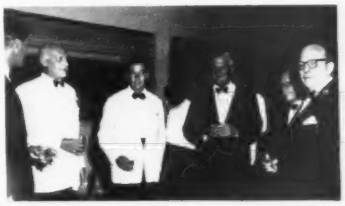
In 1908, the production of crude oil amounted to 37 barrels, as compared with 25 million barrels in 1955. To-day, some 50,000 barrels daily of foreign crude oil was processed in the refineries. Thus, the erection of a fluid catalytic cracking unit in 1952 was most timely, and has enabled Trinidad's tailor-made gasolines of high octane quality to remain competitive in the U.K.

Among refining processes which had changed recently Mr Hulme mentioned the *iso*-octane plant, built in 1937, which is now producing detergents instead of aviation gasoline.

Capital Expenditure

When current plans are completed, Mr Hulme estimated that the refinery will have spent over $40 million in a five-year period in order to keep its facilities competitive.

During the next ten years, the Chase Manhattan Bank had estimated that the oil industry in the free world would require



(Above) *J. A. Hulme, The Governor, A. C. Santos (Esso), H. W. Macnaughton-Jones (assistant general manager, The Trinidad Oil Co Ltd), R. Caldwell (Esso), and* (below) *W. Parsons, Hon. S. Hochoy (acting Colonial Secretary), and J. S. Collcott (Branch Committee Member).*

a capital expenditure of $115 billion. If Trinidad, with her one half per cent share in world oil production, was to share proportionately in this expenditure, it would indicate a capital expenditure averaging $55 million p.a. Such an expenditure was beyond current resources but by wise spending it would be necessary to do the best possible on the available funds.

Finally, Mr Hulme said he was glad such problems existed and he had every confidence in the future.

The Guests

N. Holmes proposed a toast to the guests; this was replied to by R. Lange. Among the guests present were The Minister of Labour, Industry, and Commerce, Hon. A. Gomes; The Minister for Agriculture and Lands, Hon. L. V. Bryan; The Deputy Speaker of the Legislative Council, Hon. A. Sinanan; The Archbishop of Trinidad, Count Finbar Ryan; and The Bishop of Trinidad, the Rt Rev J. Wilson.

Notes of the Month

Geelong Dredging Programme

The Geelong Harbour Trust had commenced work on a £1,400,000 dredging programme for the deepening of the main channel of Geelong harbour, Corio Bay, Victoria. Expected to be completed in 1958, the project will enable 32,000-ton vessels to visit Shell's Geelong refinery.

New Assam Wildcat

Drilling continues at Moran, in the Brahmaputra Valley, NE. India, where the Assam Oil Company's deep wildcat has yielded faint but hopeful oil indications.

At 11,065 ft the drill penetrated sub-alluvial sandstone rocks. The nearest proved oil deposits are at Nahorkatiya, some 60 miles away, where 16 wells of an average depth of 11,800 ft each have been drilled.

New Petrochemical Plant

As a first step towards meeting the steadily increasing demand for ethylene and propylene derivatives, Petrochemicals Ltd has started work on an extension to its Partington plant, near Manchester. The plant, which is expected to be in full operation by mid-1958, will produce ethylene oxide, by the direct catalytic oxidation of ethylene, at the rate of approximately 25,000 tons p.a.

Other site facilities, such as steam and power generation, cooling water, workshop, and stores, are also being enlarged.

New Laboratory for BP

On 25 June, a stone was laid by B. R. Jackson, chairman of BP, to mark the start of the construction of a new analytical and physics laboratory at The British Petroleum Company's Research Station at Sunbury-on-Thames. In addition, a production department laboratory, new main stores, boiler house and plant room, and a new canteen will be erected at a total cost of approximately £1,500,000. The contractors are Richard Costain Ltd.

The scheme is due for completion in 1958, when the present staff, numbering 800, will have increased to about 1400.

A BP photograph

B. R. Jackson (left), *H. S. Mullaly* (centre), *and C. E. Spearing* (right) *examine a model of BP's new laboratory at Sunbury Research Station.*

A BP photograph

The oil tanker Cheverny *is launched.*

New French 33,000-ton Oil Tanker

The third 33,000-ton oil tanker, the *Cheverny*, to join the shipping organization of BP's French associate, Société Française des Pétroles BP, was launched on 9 June by Marquise de Vibraye, wife of the owner of the Chateau of Cheverny from which the vessel takes her name. A fourth 33,000-ton dw tanker, the *Chaumont*, is on order.

Changed Names of BP Subsidiaries

The names of several companies of the Britisn Petroleum Group were changed on 1 June 1956, in order to identify them more closely with the group and its BP symbol. The changes are as follows.—

	New Name
Aden Petroleum Refinery Ltd	BP Refinery (Aden) Ltd
Australasian Petroleum Refinery Ltd	BP Refinery (Kwinana) Ltd
British Tanker Co Ltd ...	BP Tanker Co Ltd
D'Arcy Exploration Co Ltd ...	BP Exploration Co Ltd
D'Arcy Kuwait Co Ltd ...	BP (Kuwait) Ltd
Grangemouth Petroleum Refinery Ltd	BP Refinery (Grangemouth) Ltd
Kent Oil Refinery Ltd ...	BP Refinery (Kent) Ltd
National Oil Refineries Ltd ...	BP Refinery (Llandarcy) Ltd

Refinery Gas for North Thames Gas Board

A 10-year agreement has been reached between the North Thames Gas Board and Shell by which Shell Haven refinery will supply 25 million therms of refinery gas each year to the Board. The agreement is due to take effect from about mid-1958.

Construction of a unit for purifying and drying the gas will start shortly. A 24-inch welded steel main, through which the gas will pass at a pressure 120 p.s.i., is being laid by the Board from its works at Romford to the refinery—a distance of 17 miles.

At Romford, the refinery gas will be reformed to town gas of normal calorific value and fed into the Board's grid at that point.

The gas which will be supplied under this agreement is equivalent to the amount which would be produced by carbonizing a quarter of a million tons of coal p.a., and is equal to 6 per cent of the Board's output.

Refinery for Ireland

Plans have now been accepted by the Minister for Industry and Commerce for the erection of a refinery in the Whitegate area of County Cork. The project is now in the process design stage and it is anticipated that construction will start in about twelve months' time and be completed within three years.

The refinery will be under the joint-ownership of The California Texas Corpn, Esso Petroleum Co Ltd, and Shell-Mex and BP Ltd. It is planned to produce some $1\frac{1}{2}$ to 2 million tons of the principal fuel products, *i.e.* gasoline, diesel oils, and a range of industrial fuels, consumed in the Republic of Ireland.

Preliminary estimates indicate an expenditure by the companies of some £12 million.

Oil Search in Senegal

An oil exploration licence, covering a large area of Senegal, West Africa, has been granted to BP's French associate, the Société Française des Pétroles BP.

A new company, Société des Pétroles de Senegal, will be formed to take over this licence and carry out oil exploration in the area. BP Exploration Company will have a 30 per cent holding in the new company, S.F. BP 20 per cent, and the remaining 50 per cent will be held by French Government organizations.

BISRA "Open Days"

The British Iron and Steel Research Association are holding two "Open Days" on 6 and 7 September at their Sheffield Laboratories.

There will be a series of displays devoted to wire-drawing (including high-pressure lubrication); forging problems; hot and cold rolling; sheet metal working characteristics; electric-arc furnace operation; ingot feeder-head design; immersion casting technique for steel strips; open-hearth furnace instrumentation; the vertical high-temperature globar furnace used in the investigation of sulphur pick-up by melting steel from the impingement of oil droplets; and so on. An extensive display of advanced methods of analysis will also be mounted, including micro-chemical, absorptiometric, spectrographic, and vacuum fusion methods.

Zanzibar Well

A BP photograph

His Highness Seyyid Sir Khalifa Bin Harub, G.C.M.G., G.B.E., The Sultan of Zanzibar with Mr M. M. Pennel during his inspection of the drilling rig at the recent beginning of operations at a deep test well which the BP-Shell Petroleum Development Co of Tanganyika is sinking on Zanzibar Island.

A BP photograph

A charge explodes during seismic refractic operations on the Western edge of the Alps. See "French Oil Search" (below)

Society of Instrument Technology

The Annual General Meeting of the Society of Instrument Technology was held on 28 May. The President, Mr A. J. Young (I.C.I. Ltd) said that the Society continued to flourish as indicated by the rise in membership of 225, the highest yearly increase to date. Among the Society's activities during the past year were the Joint Conference with the Institute of Chemical Engineers to stimulate interest in instrumentation and automatic control in the chemical industry, the discussion meetings arranged in conjunction with the Instrument Industries Exhibition at Earls Court when education had been the main theme, and the recent conference at Cambridge on "Plant and Process Dynamic Control" where fundamental research had been the main topic.

Streamlining Distribution System

Shell-Mex and BP Ltd and Scottish Oils and Shell-Mex Ltd have spent or committed £6 million over the past three and a half years on new or remodelled installations in the U.K.

This news was given by A. M. Robertson, general manager of Scottish Oils and Shell Mex Ltd, when a new depot at Kirkcudbright was formally opened by the Earl of Galloway, Lord Lieutenant of the Stewartry of Kirkcudbright, who pressed a button at the main filling gantry, thereby setting in motion pumps which filled a road delivery tanker at the rate of 250 gallons a minute. "What used to be a 40-minute job on a 2000 gal tanker can now be done in eight minutes, the load being metered automatically and the driver given a printed loading note," said Mr Robertson.

French Oil Search

Oil exploration licences in the Isere Department of France, on the western edge of the Alps, have been granted to a newly formed company, Société des Pétroles de Valence, in which BP has a 30 per cent holding through its prospecting subsidiary, BP Exploration Co.

Courses in Petroleum Technology

As usual, the Sir John Cass College (Jewry Street, Aldgate, London, E.C.3) will be holding its course of lectures on the General Technology of Petroleum during the first and second terms of the 1956-1957 session. Also during the first term a series of lectures on lubrication is to be given.

Details of both these courses will be published as soon as they become available, but meanwhile intending applicants are advised to contact the secretary of the college for early information.

Monsanto Development

In his statement concerning the year 1955, the chairman of Monsanto Chemicals Ltd announces a long-term development in the field of petroleum chemicals. After discussions with the Esso Petroleum Co Ltd, an agreement has been reached in principle under which a site has been acquired adjoining the Fawley refinery. Initially Monsanto propose at this location to manufacture polyethylene from ethylene available from the Esso refinery. Later, other plastics and chemicals will be there developed from refinery products.

In other areas the production of oil additives will be further developed by increased manufacturing facilities, and a new plant to produce a detergent additive, developed by Monsanto, by a continuous process nears completion.

A major expansion of the styrene monomer production at Grangemouth has been engineered by Forth Chemicals Ltd, and a full-scale plant is being built at Newport for the manufacture of styrene–butadiene copolymers.

In Australia a development company, Pacmodhal Pty Ltd, is to study petroleum chemical potentials in association with Petroleum and Chemical Corporation (Australia) Ltd and Drug Houses of Australia Ltd.

ITALIAN PETROLEUM AND NATURAL GAS EXHIBITION AND CONFERENCE

An international petroleum exhibition and the 5th national methane exhibition are to be held in Piacenza, Northern Italy, during the period 6-16 September next. At the same venue, during the period 6-8 September, a technical-economic meeting on the subject of hydrocarbons is also to take place.

The prime object of the exhibitions is to show plant and machinery connected with all phases of the production and use of liquid and gaseous hydrocarbons.

The conference will be presided over by Professor Carlo Padovani and the opening address will be given by Enrico Mattei, president of ENI.

The provisional programme includes papers as follows:

"Origins, developments, future possibilities of gas utilization in Italy."
"Exploitation of gaseous hydrocarbon fields in the Po Valley."
"Co-ordination in the employment of natural gas in Italy."
"The contribution of natural gas to the Italian needs of energy."
"Transmission and distribution of natural gas in Italy."
"Natural gas as a fuel in the Italian industries."
"Partial or total delivery of natural gas through urban networks previously served by coal-gas."
"From coal-gas to natural gas."
"The contribution of oil products to the problems raised by the distribution of natural gas to household consumers."

On 9 September visits will be made to factories and plants using gas in the Province of Piacenza.

Details of the meeting and of the exhibition are obtainable from the Manifestazioni Fieristiche Piacentine, Piazza Cavalli 35, Piacenza, Italy.

PRESENTATION OF INFORMATION

There is in the minds of scientists and technologists a wealth of technical information accumulated as the result of years of experience and study. The key to unlock this vast store of valuable data is the ability to communicate it lucidly by word of mouth or in writing.

Recently the Editor of the *IP Review* had the privilege of attending the final session of a 10-day course on the Effective Presentation of Technical Information organized by Osmond Turner Mead Associates in London. The stated object of the course is to teach scientists and technical men to present their information effectively in speech or writing.

On this occasion seven course members, four of them from the petroleum industry, were required to speak on a subject outside their own sphere of interest and one not of their own selection. Thus, one oil man took the chair, another spoke on industrial relations, the third on the problems of the tobacco industry, and the fourth on nuclear energy and the power gap. The result left no doubt as to the value of this training and this was confirmed in subsequent conversation with the members of the course. A number of courses concerned with management and similar problems are held by the organizers, who have recently changed their address to 3 Gower Street London, W.C.1.

U.K. CONSUMPTION OF PETROLEUM PRODUCTS

In the first three months of 1956, U.K. deliveries into inland consumption of petroleum products increased by 692,513 tons over the corresponding period last year. According to figures published by the Petroleum Information Bureau on behalf of the U.K. Petroleum Industry Advisory Committee, nearly half this amount is attributable to fuel oil which increased by 366,798 tons.

The full details are as follows :—

	Jan. to March (tons)	
Product	1955	1956
Aviation fuels	397,469	415,751
Motor spirit (incl. motor benzole)	1,319,344	1,405,666
Industrial spirits (incl. industrial benzole)	31,986	37,677
White spirit	35,254	36,643
Kerosine		
Burning oil	276,541	336,760
Vaporizing oil	152,506	128,178
Total kerosine	429,047	464,938
Derv fuel	363,031	420,773
Gas, diesel, and fuel oils		
Gas/diesel oil	653,327	710,698
Fuel oil	1,529,682	1,896,480
Total gas, diesel, and fuel oils (excl. refinery consumption)	2,183,009	2,607,178
Refinery consumption	521,441	549,908
Total gas, diesel, and fuel oils (incl. refinery consumption)	2,704,450	3,157,086
Lubricating oils and greases	208,235	208,636
Paraffin wax and scale	11,516	12,726
Propane and butane	14,965	16,605
Bitumen	167,019	191,335
Other products	154,662	161,655
Total all products	5,836,978	6,529,491

Note: Deliveries for bunkers for ships engaged in the foreign trade are not included. Figures refer to inland consumption only.

MIDDLE EAST PRODUCTION

	May	*Jan. to May*
	Tons	
Iraq Petroleum Co Ltd	2,107,251	9,905,408
Basrah Petroleum Co Ltd ...	694,140	3,466,285
Mosul Petroleum Co Ltd ...	108,838	521,238
Iraanse Aardolie Exploratie en Productie Mij*	2,285,000	9,882,000
Qatar Petroleum Co Ltd	515,597	2,474,526

* The refinery throughput at Abadan of the Iraanse Aardolie Raffinage Mij for May was 933,000 tons, the total for January to May being 4,058,000 tons.

BRITISH BENZOLE PRODUCTION

U.K. production of motor benzole and of motor and aviation spirits from coal totalled 80·8 mil gal in 1955, a decrease of 5 per cent from the 1954 figure. Details published by the Ministry of Fuel and Power are:—

	1954	1955
	Million gallons	
Motor benzole from :		
Coke ovens	26·3	24·3
Gas works	12·1	12·4
Tar distilleries and benzole refineries	12·0	11·5
Motor and aviation spirits from :		
Low temperature carbonization ...	0·9	0·9
Hydrogenation	33·7	31·7
	85·0	80·8

BRITISH AND BRITISH/DUTCH PRODUCTION

Details of crude petroleum production and refinery operations overseas, excluding British operations in North America, are given in the Ministry of Fuel and Power Statistical Digest 1955. The following figures are extracted therefrom.

		Thousand Tons			
		Production of crude	*Refinery Operations*		
			Total throughput	*Refinery fuel and loss*	*Total output*
Europe . . (excl. U.K.)	1954	650	27,836	2,171	25,665
	1955	681	29,420	1,473	27,947
Middle East .	1954	46,145	4,929	487	4,442
	1955	56,727	11,429	1,324	10,105
India, Pakistan, and Burma .	1954	747	723	109	614
	1955	812	1,996	233	1,763
Far East and Australasia .	1954	10,398	12,133	736	11,397
	1955	10,727	14,824	1,193	13,631
Caribbean and S. America .	1954	37,145	37,932	2,564	35,368
	1955	43,487	37,692	3,188	34,504
Total . .	1954	95,085	83,553	6,067	77,460
	1955	112,434	95,361	7,411	87,985

Petroleum in Parliament

U.K. Oil Companies

In a written reply on 12 June, the Minister of Fuel and Power said he would not introduce legislation to nationalize all oil companies registered in the U.K.

Canadian Oil Resources

On 12 June, the Chancellor of the Exchequer said that the total of approved investment in the development of Canadian oil resources was of the order of $110 million from 1950 to 1956.

Oil Substitution

On 18 June, the Minister of Fuel and Power said that the total deliveries of black oils—other than refineries, own consumption and diesel oil for road vehicles—increased by 1·2 million tons, or 18 per cent, between the year ending March 1956 and the previous year.

War-time Oil Stocks in Singapore

On 4 June, in a written reply on the present position of the claim by oil companies for compensation for oil stocks which disappeared in the closing stages of the fighting in the Far East, the Parliamentary Secretary to the Admiralty said that judgment was given for the oil companies by the Court of Appeal on 13 April 1956. This reversed the award of the Compensation Board but a stay of execution pending consideration of an appeal by the Crown to the Privy Council was at present in operation.

Diesel Exhaust Gases

In a written reply on 8 June, the Parliamentary Secretary to the Ministry of Works said that with a diesel engine properly maintained and operated, the exhaust fumes contained a small amount of solid carbonaceous matter and the following gaseous constituents, listed in descending order of concentration: nitrogen, carbon dioxide, oxygen, carbon monoxide, oxides of nitrogen, hydrogen, hydrocarbons, oxides of sulphur, and aldehydes. If the engine was not properly maintained and operated, the concentrations of carbon monoxide, oxides of nitrogen, hydrogen, and hydrocarbons were higher; in addition, there might be sufficient solid carbonaceous matter to produce blue-grey or brown smoke and, in extreme cases, a dense black smoke. The emission of visible smoke from a diesel engine was due to the engine being in poor condition, or to over-loading, or to maladjustment of the fuel control by the driver.

Oil Pollution

On 30 May, the Minister of Transport and Civil Aviation said in the House that the Governments of Mexico and Sweden have recently ratified the International Convention for the Prevention of Pollution of the Sea by Oil. He also stated that a number of other countries have taken powers that will enable them to do likewise.

In reply to a question on 6 June, the Minister of Transport and Civil Aviation said that he proposed to make regulations under the Oil in Navigable Waters Act, 1955, requiring dry-cargo ships registered in the U.K. which use their fuel

tanks for water ballast to be equipped with oily water separators. The Minister also said that such apparatus was not necessary in other classes of ships, and he did not propose at present to extend the requirement to ships of other flags when using our ports.

In reply to a supplementary question, the Minister said he proposed, within the next few days, to make the necessary Order to bring into operation the Oil in Navigable Waters Act, 1955, and also to make a number of Regulations under it. He also said that the Order and Regulations would not, however, become operative for three months because advance advice of their provisions must be given to the masters of U.K. registered ships wherever they may be.

Oil Separators

In a written reply on 13 June, the Parliamentary Secretary to the Admiralty said that no warships at present on active service were fitted with separators. On the other hand, rather more than half of the Royal Fleet Auxiliary dry-cargo ships had separators which could deal with both oily bilge and ballast water; 20 per cent of Royal Fleet Auxiliary tankers had bilge separators, and approximately 15 per cent of the tankers also had cargo tank separators.

He also said that the quantity of oil produced by bilge separators was usually negligible; but the washings of a 13,000-ton cargo of furnace fuel oil, for example, could contain up to 20 tons of usable oil. It was not possible to assess the total amount recovered by the equipments fitted in the tankers and dry-cargo ships, as the conditions of their employment vary considerably. Each of four special tank-cleaning vessels, however, recovered some 1000 tons p.a. of usable oil. The value of oil recovered by these means was between £7 and £8 a ton.

Oil–water separators, he said, were only necessary for warships and dry-cargo vessels which regularly used their fuel tanks for the carriage of water ballast.

Trinidad Oil Company

In a statement to the House on 14 June, the Chancellor of the Exchequer referred to the Texas Oil Company's offer to buy the entire issued ordinary stock of the Trinidad Oil Co Ltd. The Chancellor said that the assent of the Government was required for this transaction.

He then outlined the interests of the Company of which the following are the most important. First, in Trinidad itself it has oil leases from which it produces just over a million tons of oil a year and a refinery which processes nearly 4 million tons of crude a year, including some on behalf of the Texas Company. The products are distributed mainly in the Caribbean area and in the U.K.

The Company has marketing subsidiaries in the Caribbean, in Jamaica, in Puerto Rico, and the Dominican Republic. Elsewhere in the Caribbean, the Company markets on a 50 : 50 basis with Shell. It also holds one-third of the shares in Trinidad Northern Areas Ltd. This company engages in oil exploration including marine drilling. The other shares are held equally by Shell and British Petroleum interests.

In addition, the Trinidad Oil Co Ltd has a 50 per cent share in the Regent Oil Co Ltd, which at present distributes about 6 per cent of all petroleum products used in the U.K. The other half is owned by Caltex (U.K.) Ltd, a wholly owned subsidiary of the California-Texas Corpn, which, in turn, is owned as to 50 per cent by the Texas Co and as to 50 per cent by the Standard Oil Co of California.

Finally, the Trinidad Oil Co owns 89 per cent of the shares in the Regent Refining (Canada) Co, which is concerned in refining and marketing petroleum products in Canada. This Company's present production of crude oil from its concessions in Alberta is negligible.

Continuing, the Chancellor said that the production of the Trinidad Oil Co Ltd was about one-sixth of 1 per cent of free world oil production but this represented about one-third of the crude oil production of Trinidad. The Company has stated publicly that it has not the financial resources to maintain its position in an expanding oil world.

In considering this matter, the Chancellor said that H.M. Government were concerned with the interests both of Trinidad and the U.K. The Government of Trinidad had made it known that they wanted to see exploration intensified, existing oil resources exploited at the maximum economic rate, and the refinery operated at full economic capacity and, if possible, expanded.

Subject to certain safeguards, such as maintaining existing industrial relations, the fair treatment of existing personnel, and that there should be no racial discrimination, the Chancellor said the Government of Trinidad is in favour of this transaction. In consequence, H.M. Government was under an obligation to ensure that the conditions made by the Government of Trinidad were met.

In regard to the interests of the U.K., in time of war the Governor of Trinidad had power, under the mining leases, to pre-empt all oil works and products thereof, and, if necessary, to take entire charge of the works.

As regards the balance of payments, the Chancellor said that, if the transaction was permitted to take place, H.M. Government would make it a condition that the marketing operations should be carried on under arrangements comparable with those made with other American oil companies.

The Chancellor said that for these reasons H.M. Government had decided that they are in principle willing to give permission for this transaction to go through, subject, of course, to the ordinary law, both in the U.K. and in Trinidad, being complied with, but more particularly subject to the following conditions and undertakings:—

First, that the following specific conditions are complied with in any rearrangement of the present company structure:—

(*a*) the marketing operations are carried on under arrangements satisfactory to H.M. Government, on a basis comparable with those already existing with other American oil companies;
(*b*) the production and refining operations in Trinidad are carried on by a company registered in Trinidad.

Secondly, that H.M. Government and the Government of Trinidad receive satisfactory undertakings on the following matters:—

(*a*) the Trinidad refinery is operated at full economic capacity and, if possible, expanded;
(*b*) exploration in Trinidad is intensified;
(*c*) existing oil resources in Trinidad are exploited on the basis of existing and established practice;
(*d*) industrial relations are maintained on the basis of existing and established practice;
(*e*) there is fair treatment of existing personnel and training of as many local men as possible to take high positions in the Company;
(*f*) there is no racial discrimination in any of the Company's plant or camps and the rights of local persons are respected.

Britain's Rising Need for Oil

New £13 million expansion at the Esso Refinery

A further £13 million expansion programme is to be carried out at the Esso Refinery, Fawley. This is additional to the £9 million project, recently revealed, to supply raw materials for the manufacture of synthetic rubber and other chemical products.

This latest development is being undertaken in order to meet the rapidly increasing energy needs, which call in particular for large extra quantities of fuel oils.

When this expansion is completed, at the end of 1958, the total capital investment in the Esso refinery will amount to £68 million, and throughput will have been raised from the current 7½ million to 10½ million tons a year.

The principal items in the programme will be:—

(1) A third pipestill with a capacity of 9600 tons a day.

(2) Two new autodiesel hydrofiners. These plants will reduce the sulphur content of diesel fuel and improve its quality. Two hydrofiners are already in operation at Fawley, one for autodiesel, and one for white spirit.

(3) A second sulphur recovery plant, which will produce 99·9 per cent chemically pure rock sulphur. This plant will double the refinery's current annual output of 14,000 tons of sulphur, which is at present entirely taken up by the textile industry.

(4) A large additional amount of tankage for the storage of crude oil and finished products.

(5) A new jetty berth at the marine terminal. Already one of the longest oil docks in the world (3200 ft), a fifth berth is now to be added. This will enable five ocean-going vessels to be berthed simultaneously.

(6) A new oil and water separator plant, duplicating the existing facilities for purifying water used in refinery processes, before it is released into Southampton Water.

It is estimated that over 90 per cent of all materials used in the new construction will be British, compared with 66 per cent during the initial expansion programme in 1949-51.

These extensions will involve a construction force of well over 4000 men at the peak period, and will raise the number of regular employees at the refinery from the present figure of 3100 to approximately 4000.

Commenting on these plans, Sir Leonard Sinclair, chairman and managing director of Esso Petroleum Co Ltd, said:—

"To meet the demands likely to be made upon us, my Company is planning to double its present volume of business within the next five years. This new expansion programme—a total of £22 million when taken together with the £9 million chemicals-from-oil project—is an indication of the size of the task which now confronts us.

"Much of this programme is aimed at increasing supplies of the heavier fuels, on which the British economy is dependent to a steadily increasing extent, and at making these fuels available at the minimum dollar cost.

"The Esso refinery at Fawley is already saving the nation an estimated £150 million a year in foreign exchange. This new expansion will increase that saving to a figure in excess of £250 million a year."

Trade Literature etc.

Insulation

For more than fifty years, Newalls Insulation Co Ltd have specialized not only in the sale and manufacture of insulating materials but also in their application. Some idea of the work undertaken by this firm may be obtained by studying their latest publication "Newall's Heat, Cold and Sound Insulation."

Although this profusely illustrated compendium is not available on request to the firm, it has been distributed to technical and public libraries and associations throughout the U.K.

Cathodic Protection

A brochure entitled "Guardion Protection for Marine Applications" has recently been published by F. A. Hughes and Co Ltd, Devonshire House, Mayfair Place, London, W.1. This shows how the "Guardion" technique has been applied to shipping, harbour installations, and allied equipment.

The company have also published leaflets dealing with "Guardion" volt-ammeters and graphite anodes, and the application of cathodic protection to chemical plant and gas, water, and petroleum installations.

Speedy Service on the Forecourt

A panel of independent judges has declared the White Rose Engineering Co Ltd as winners of the third Mobil Friendly Service Contest.

This annual contest is designed to promote good service, efficiency, and courtesy at Mobilgas service stations throughout the U.K. Points are awarded for (1) speed and efficiency of service, (2) appearance and attitude of forecourt attendant, (3) general appearance of station; forecourt, equipment, and displays, and (4) availability and cleanliness of toilets.

Books and Films

Livestock Farming

Subsequent to the release of the film "The Mechanization of Livestock Farming", Shell-Mex and BP Ltd have issued a booklet with the same title. Profusely illustrated, the booklet shows some of the ways in which British farmers are harnessing machinery to meet the problems of rising costs and growing labour shortage.

British Oil Industry

The 1955 volume of The Ministry of Fuel and Power Statistical Digest (HMSO £1 7s net) brings up-to-date generally to the end of 1955 the detailed statistics of operations in the petroleum industry of Great Britain. Details are also given of the use of petroleum products for power production in other spheres, *e.g.* in electricity undertakings and in gas-works. Comparative figures for previous years are given and the whole forms a valuable compilation of statistical information.

British Industry Review

The 1956 annual review of British Industry by the *Financial Times*, takes the theme of The Changing World. In all, there are over 50 articles covering practically every phase of British Industry. Of particular interest to the petroleum industry are articles which deal with oil requirements for U.K. energy needs, with oil and energy supplies in the next twenty years, with chemicals from petroleum, with the advent of synthetic rubber manufacture in Britain, and with the use of petroleum in the gas industry. Price of the review is 1s. and copies are obtainable from the *Financial Times*, 72 Coleman Street, London, E.C.2.

An interesting review of the pattern of oil consumption and production, reserves, refining developments, and other factors concerning the oil industry is the *Financial Times* "Survey of Oil" which was published on 25 June. In a series of 25 articles by named authors or by special correspondents, all aspects of the industry are discussed and much useful information is given.

Education for Employees

Following an experimental occasion last October, some 5000 men and women employees of The Shell Petroleum Co Ltd attended a special film programme on the petroleum industry at the Dominion Cinema, Tottenham Court Road, on 22, 25, and 26 June.

The films shown were "Birth of an Oilfield", "Look at Your World (No. 2)", "Shell's Progress in 1955", and "The Rival World", a review of which appeared in our December issue.

The Company state that members of the staff welcomed this addition to various other ways of keeping them informed of events in the petroleum industry.

Register of the Gas Industry

The 1956 edition of this 350-page volume is divided into three sections. The first section is a directory of the Ministry of Fuel and Power; The Gas Council; National, District, and Junior Associations; Allied Institutions; and Gas Boards, Groups, and Divisions in the U.K., Canada, Australia, New Zealand, and South Africa.

The second section is devoted to technical information in respect of carbonizing plant, including water gas; refractories; chemical and by-product plant, including purification; gas-holders; gas-works testing; coal and coke; plant and equipment on works; distribution equipment; meters; cooking; space heating; water heating; industrial and commercial heating; and the preservation of gas-works plant.

The third section is a list of "where to buy" various products. Finally, there is an index to commercial and technical information.

Forthcoming Meetings

THE INSTITUTE

(*At* 26 *Portland Place, London, W.*1, 5.30 *p.m.—tea* 5 *p.m.*)

Diesel Combustion Study by Infra-red Emission Spectroscopy. W. T. Lyn, Ph.D., M.Sc.(Eng.). **19 September**

IP SOUTH-WALES BRANCH

(*At Training Centre, BP Refinery (Llandarcy) Ltd*, 5.30 *p.m.*)

The Place of the Chemical Engineer in the Petroleum Refining Industry. H. E. F. Pracy, B.A., M.I.Chem.E. **4 October**

SITUATIONS VACANT

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Applications are invited for the post of Grade II Lecturer in Petroleum Production Engineering from honours graduates in Engineering with practical experience. Range of salary £650 to £1350 p.a. with efficiency bar at £900. Candidates will be expected to carry out research in some field appropriate to petroleum production, preferably reservoir engineering, for which adequate facilities are available.

Applications should be sent by 1 September 1956, to the Registrar, the University, Birmingham 15, from whom further particulars may be obtained.

The University,
Birmingham, 15.
July 1956.

G. L. BARNES,
Secretary.

Geological Survey and Museum, London: The Civil Service Commissioners invite applications for a pensionable post under the department of Scientific and Industrial Research as Geologist or Senior Geologist according to age and qualifications. The work is connected with geophysical surveys in the field.

Candidates must have, or obtain in Summer of 1956, a first or second-class honours degree in Geology, or Geophysics, or Physics or Mathematics with at least first year standard both in Geology and in Physics or Mathematics or equivalent qualification, or have other suitable qualifications. Experience in Applied Geophysics an advantage. For appointment as Senior Geologist candidates must have at least 3 years' post-graduate or other approved experience.

For Senior Geologist candidates must be at least 26 on 1 July 1956. For Geologists at least 21 and under 30 years (under 31 for established members of the Experimental Officer class) on 1 July 1956, with extension for regular Forces service. Salary scales: Men £605-£1055 or £1135-£1345; Women £605-£962 or £1026-£1240 according to grading. Women's pay being improved under equal pay scheme. Provision for starting pay above minimum. Promotion prospects.

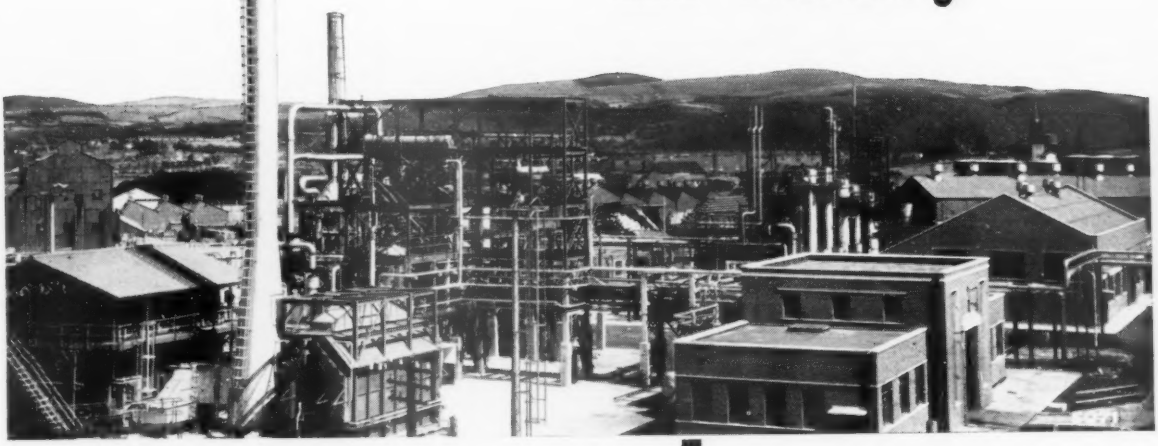
Further particulars and application forms from the Civil Service Commission, Scientific Branch, 30 Old Burlington Street, London, W.1, quoting No. S 4612/56/8. Application forms should be returned by 31 August 1956.

Physical-Chemist with good honours degree needed for research team engaged in the development and application of mass spectrometers. The work covers a wide field, from the development of analytical techniques to the use of the instrument for the study of fundamental physical-chemical problems.

Write for Application Form, quoting reference "E.6", to:—
Personnel Manager,
Metropolitan-Vickers Electrical Co Ltd,
Trafford Park, Manchester 17.

Llandarcy Autofiner, South Wales. Photo by courtesy of The British Petroleum Co., Ltd.

Catalysts for Research and Industry



Commissioned in July 1952, The British Petroleum Co. Autofiner at Llandarcy uses Spence cobalt and molybdenum oxides on alumina catalyst, and has been in continuous operation since that date for the desulphurisation of tractor fuel.

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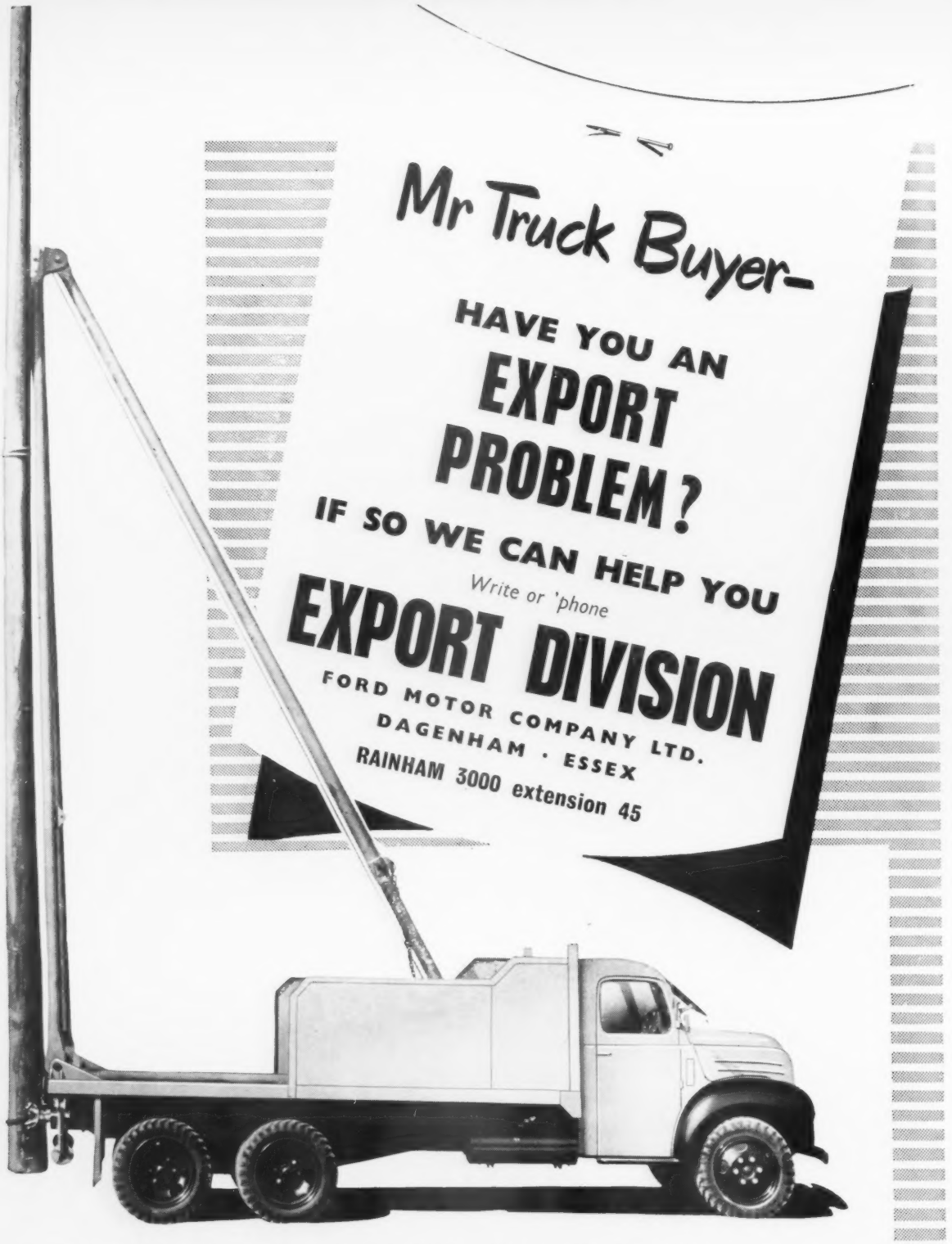

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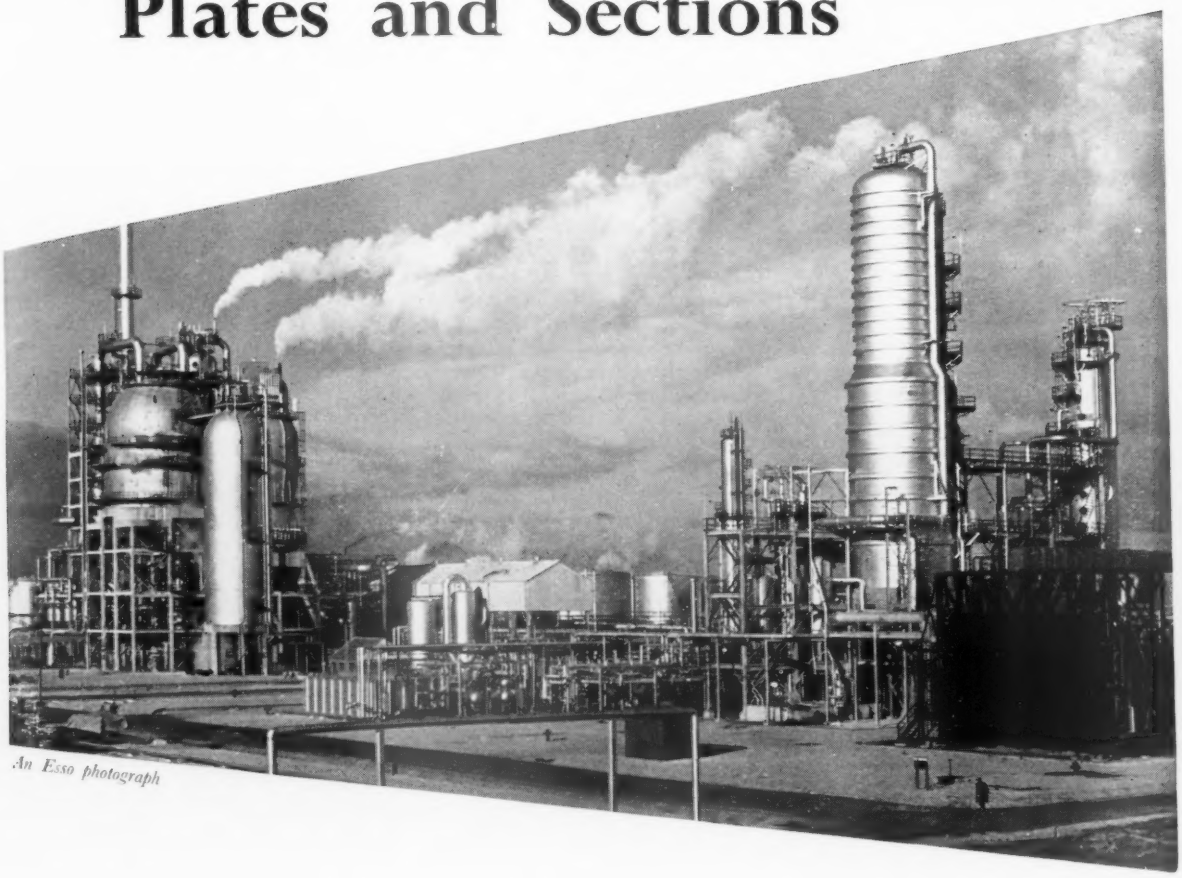

An Esso photograph

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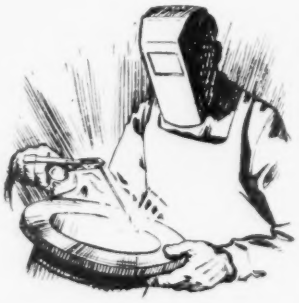

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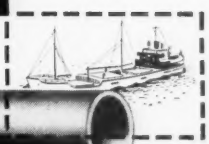

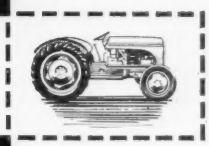

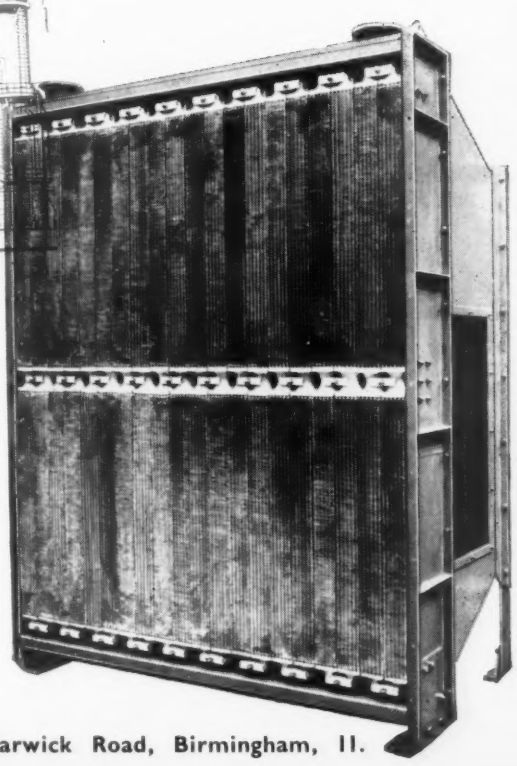

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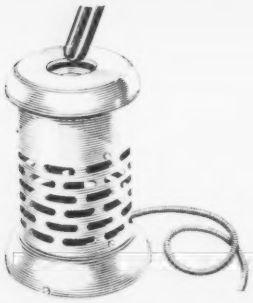

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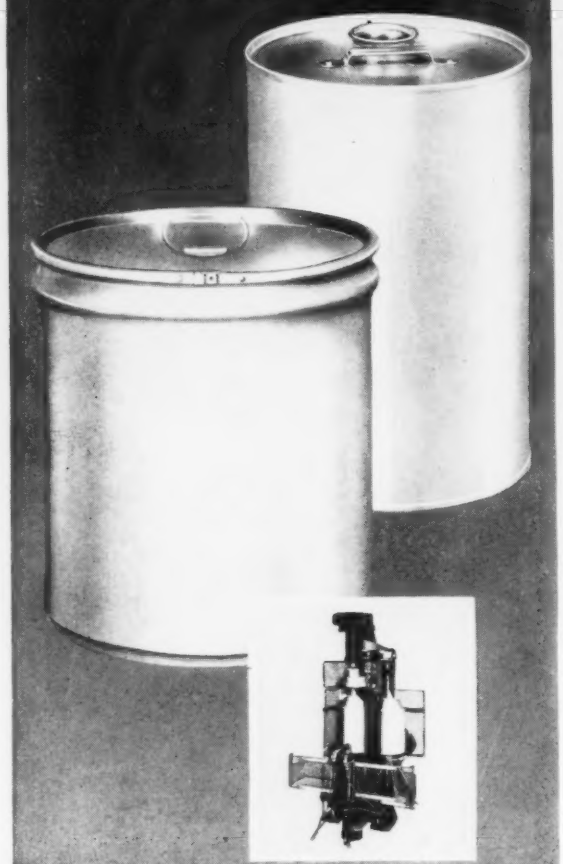

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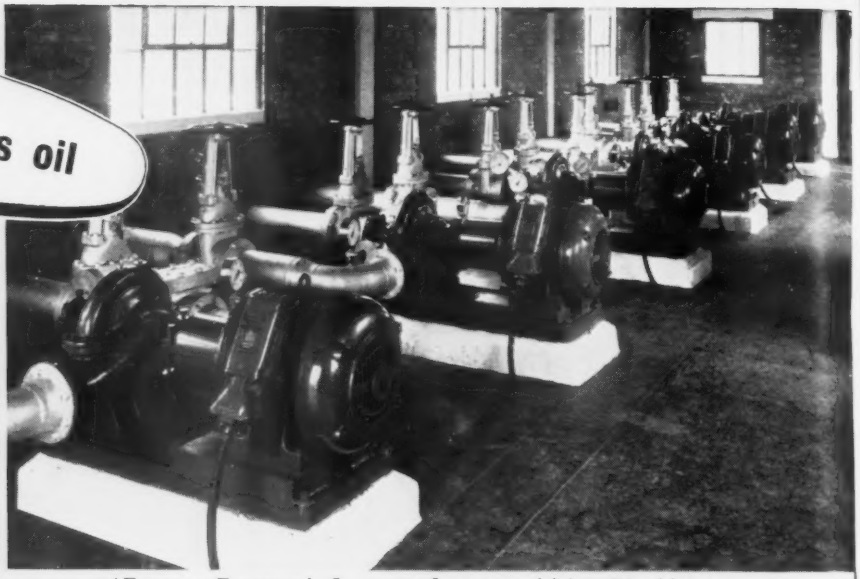

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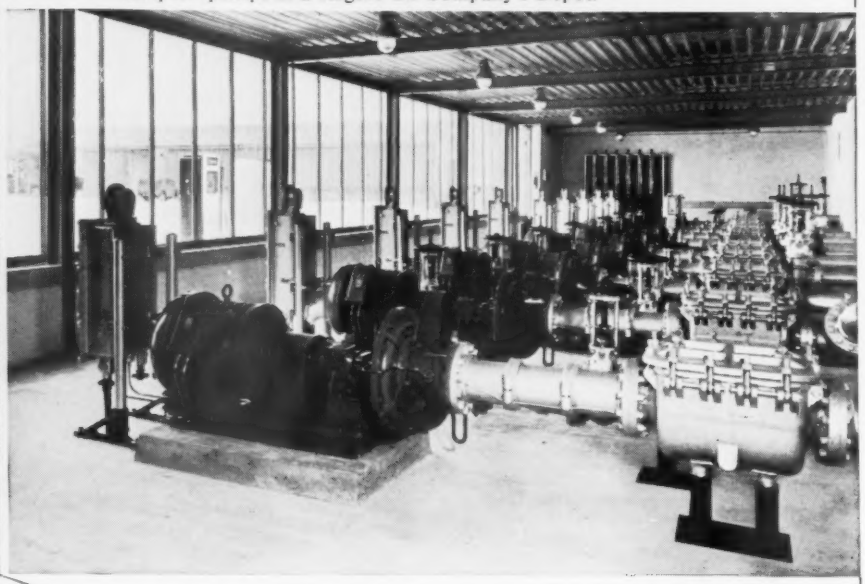

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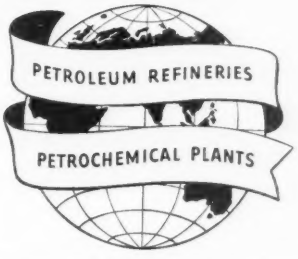

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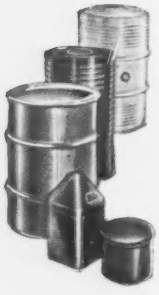

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